Master's Thesis of Public Administration

The Inflation - Output Gap Dynamics in Ecuador:

A Descriptive Analysis during Episodes of Positive and Negative Output Gaps. 1970 – 2014.

에콰도르의 인플레이션과 Output Gap 간 다이나믹스 연구:

1970 년-2014 년 Output Gap 사례에 대한 기술적 분석

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Abstract

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This research paper is a descriptive, empirical analysis of inflation dynamics during past episodes of positive and negative output gaps. In so doing, this study pay attention to the new Keynesian Phillips Curve theory as guide to support the theoretical expectations between the mentioned variables, and it includes the analysis of historical events and key-macroeconomic variables in order to know other factors that could affect this relationship.

This research includes four episodes of positive output gaps and four episodes of negative output gapes since 1970 to 2014. The analysis finds that episodes of positive output gaps generally generate an inflationary process, which can be mainly affected and distort by social events such as political instability and oil prices. On the other side, negative output gaps generally brought disinflation however, exceptions are limited to the effect of historical events, low initial inflation rates, the economy recovery from previous periods, and lower oil prices in several cases.

Nevertheless, these findings are qualified only by the observation of inflationary and disinflationary pressures within episodes of positive and negative output gaps. Consequently, in this study, the failure of theoretical expectations in some cases is most likely related to external shocks, such as historical events, initial low or high inflation rates, oil prices and government inflation targets.

Overall, the past- real evidence provides some assurance that output gaps matter in inflation dynamics, at least when the economy is not affected by the shocks mentioned before.

Finally, the research suggests the periodic calculation of the output gap as a useful indicator for the economic authorities to strength the public policy process to monitor and control inflation in advance. Therefore, the estimation of the output gap should take into account a proper methodology, which fits, and reflect better the Ecuador's reality and social structure. Additionally, the ultimate goal of this research is to suggest government that science or theoretical expectations might not be always right or complete enough to explain social phenomena or changes in economy. Government's public policies should be based on four main aspects: science, past evidence, social context and political judgment.

Key words: Output gap and inflation, inflation and historical events, Ecuador's output gap, Ecuador's inflation.

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ABREVATIONS AND ACRONIMS

CPI: Consumers Price Index.

EAP: Economically active population.

ENIGHU: Encuesta Nacional de Ingresos y Gastos de Hogares Urbanos of Ecuador (Spanish). National Survey of Income and Expenditure of the Urban Ecuadorian Households.

GDP: Gross Domestic Product.

IMF: International Monetary Fund.

INEC: Instituto Nacional de Estadísticas y Censos (Spanish). National Institute of Statistics and Census.

NKPC: New Keynesian Phillips Curve.

PETROECUADOR: National Oil Company of Ecuador.

SENPLADES: Secretaría Nacional de Planificación y Desarrollo de Ecuador (Spanish). National Secretariat of Planning and Development of Ecuador.

SVAR: structural vector autoregressive models.

USD: United States Dollar

CHAPTER ONE

1. INTRODUCTION

1.1. PROBLEM

Over Ecuador's economic history, government planning has not played an important role making public policy decisions. For many years prior to the current presidential term, public policy was making based on past country´s experiences or foreign experiences that tried to be fitted regardless the cultural, economic or social differences that may exist. Additionally, government's decisions obeyed to power groups and their interests, which stopped the growth and development of economy. During the current presidential term, “planning” becomes important for the Ecuadorian government. On February 22, 2007, the National Secretariat of Planning and Development (SENPLADES) was created in order to "Establishing strategic objectives and policies based on information processes, research, training, monitoring and evaluation. This institution guides public investment and promotes the democratization of the state through active citizens’ participation which contributes toward a transparent and efficient public administration” (National Secretariat of Planning and Development, 2014).

According to this objective, it is evident how important technical studies are to help the economic authority to have wider perspective about economic and social reality of the country, in order to develop a state

planning, optimize resources and generate better public policy to achieve the state goals related to generate economic growth and development.

In 2000, Ecuador left its own currency (Sucre) and adopted the United States Dollar as its new currency. In 1982, Ecuador began to face a process of chronic inflation where inflation rate increased rapidly, exceeding 20 percent per year. Between 1982 and 1999, the annual inflation rate average was 40 percent. This monetary weakness was the result of the debt crisis, which implied an economic policy change. The government began to restrict imports and promote exports by reducing the cost of production on its international price using the depreciation of the real exchange rate. This policy implied the increase of tradable goods prices in comparison to not tradable goods. Therefore, the nominal exchange rate between the Sucre and the Dollar began to be depreciated gradually. At the same time, the devaluation of the exchange rate contributed to accelerate inflation. In a context of high and lasting inflation, the currency began to lose purchasing power, making that economic actors replace the national currency with US dollars, causing a partial dollarization over 50 percent. The partial dollarization and speculation on the exchange rate brought an economic and financial crisis in 1998 and 1999 whose solution for the government at the time was the integral dollarization in 2000.

This situation brought a limitation to use and apply monetary public policy. First, to adopt the U.S. Dollar as legal currency, the State renounced the seigniorage to issuing its own currency. It thus, after dollarization,

Ecuador buys his paper money not due its costs to manufacture it, but due its nominal value, which imply assign real resources to that purpose. Second, when Ecuador adopted the dollar as its currency, it began to face fluctuations in the real exchange rate with all its trading partners. Most of these partners use the devaluation of its currency to help their national production to be competitive on external markets and protect its domestic industries. The dollarization in Ecuador made losing a powerful instrument of monetary policy as the exchange rate is. As Dávalos mentions (2004:19), 'An appropriate monetary and credit policy to each moment of trade cycles is a powerful instrument to ensure the development of an economy'. Sadly, nowadays, because of dollarization, Ecuadorian-economic authorities have more limitations and less tools to manage the economy, which implies to pay more attention and to be more careful before to apply any economic policy.

In this context, this study wants to focus in the dynamics between the inflation and output gap[1] as one of the ways to obtain useful information as a good guideline for the economic authorities to generate better public policies in an anticipated way to monitor inflation in the future. In this purpose, this research not only wants to know numbers and their variations, but also the inflation and output gap dynamics through the time as a descriptive and qualitative analysis. The historic variation of inflation will be analyzed during negative and positive output gap episodes separately in order to find some patterns or special behaviors. These dynamics will be explained and related to

[1] The output gap is the difference between the Real Gross Domestic Product and the Potential Gross Domestic Product

theoretical expectations, historical events, such as, political, social and economic; as well as to key macroeconomic variables that can provide information about labor market, public policy, government income and expenditure.

As it was mentioned before, this historical and empirical approach, tries to provide direct and real evidence for the inflation dynamics during the past during negative and positive output gaps episodes. The government and specially Central Bank can use this historical evidence as a complementary instrument to set public policies to monitor inflation. Public policies based on not only policy rules (theoretical expectations), current political, social and economic situation, discretion, but also experience and past evidence.

1.2 RESEARCH QUESTIONS

1.2.1 GENERAL

How inflation has behaved in Ecuador during positive and negative output gaps from 1970 to 2014?

1.2.2 SPECIFIC

1.2.2.1 In the case of Ecuador during 1970 - 2014, how much empirical evidence is there for or against the theory that positive output gap generates inflationary pressures in the economy?

1.2.2.2 In the case of Ecuador during 1970 - 2014, how much empirical evidence is there for or against the theory that negative output gap does not generate inflationary pressures in the economy?

1.2.2.3 From 1970 to 2014, are there any historical events that have affected the inflation evolution during episodes of positive and negative output gaps?

1.2.2.4 Can the output gap be a useful indicator as a rough guide to take into account before to generate future public policy to monitor inflation rate in Ecuador?

1.3. OBJECTIVES

1.3.1. GENERAL

To know the behavior of inflation in Ecuador during positive and negative output gaps from 1970 to 2014.

1.3.2. SPECIFIC

1.3.2.1. To know how much empirical evidence there is for or against the theory that a positive output gap generates inflationary pressures in the economy from 1970 to 2014.

1.3.2.2. To know how much empirical evidence there is for or against the theory that a negative output gap does not generate inflationary pressures in the economy from 1970 to 2014.

1.3.2.3. To identify historical events that could affect the inflation evolution during episodes of positive and negative output gaps from 1970 to 2014.

1.3.2.4. To identify if the output gap can be a useful indicator as a rough guide to take into account before to generate future public policy to monitoring and control inflation rate in Ecuador.

1.4. JUSTIFICATION

1.4.1. THEORETICAL JUSTIFICATION

The New Keynesian Phillips Curve (NKPC), which will be studied later, is a relatively modern macroeconomic theory, which shows the relationship between output and inflation rate (Meier, 2010). The NKPC is the theoretical basis of this study, which allows analyzing the dynamics between the inflation and output gap deeply.

Commonly, many social and economic researches study the NKPC in a single-equation approach by using econometrical methods where the current inflation is a function of past inflation, expected future inflation and output gap. However, the experience of the NKFC has shown many difficulties in this model. First, Nason and Smith (in Meier, 2008:6) mention that 'empirical studies of the NKPC typically report that the output gap coefficient is very small and often statistically insignificant' which imply irrelevant coefficients of output gap to inflation. Second, the econometrical estimation requires the identification of strong instrumental variables, which are not easy to find and

typically scarce (Meier, 2010). This is the problem of weak instruments, first noticed by Ma (2002) and Mavroeidis (2005). Additionally, in reality there other factors and variables, such as political and social events as well as macroeconomic variables that independently affect inflation. Those factors and variables are not considered, which makes the estimation 'suffer from omitted variable bias' (Meier, 2010: 6).

Finally, another aspect to take into account is that a single-equation cannot capture the dynamics and possible nonlinearities between inflation and output gap. However, in practice, 'output gaps could have a disproportionate effect on inflation when they are large in absolute terms; and their effect might be greater or smaller for negative than for positive output gaps' (Meier, 2010:6).

All of the previous arguments might show a spuriously and weak relationship between output gap and inflation for standard econometric models. Nevertheless, as Meier (2010: 4) mention, 'there is much more potentially importance in practice'. That is why; all the difficulties already mentioned can also provide a theoretical motivation to develop this research from an empirical approach. This study will use a qualitative and descriptive analysis to know the inflation behavior during positive and negative output gaps from 1970 to 2014 by considering not only theoretical expectations, but also other factors that could affect inflation, such as historical events and key-macroeconomic variables.

1.4.2. METHODOLOGICAL JUSTIFICATION

To meet the objectives of this research the period 1970 – 2014, it will be divided by episodes of continuous positive and negative output gaps. This segmentation will help this study to provide real and direct evidence about the behavior of inflation during each episode in order to verify the theoretical expectations, identify historical events and key macroeconomic variables, which could have affected the expected relationship between the output gap and inflation. Additionally, the segmentation will also assist to compare easily the inflation dynamics among episodes.

1.4.3. PRACTICAL JUSTIFICATION

Since Ecuador is a dollarized economy, monitoring and controlling inflation is more important to avoid liquidity issues and economic problems in the future.

Currently, the Ecuadorian government´s tools to make policies to achieve prices stability are the Consumers Price Index (CPI) which is a measure of the prices level variation by using a monthly survey; and forecasting the future inflation rate. However, because monetary policy limitation, it is essential to find and establish further indicators and tools, which can provide useful information in advance to make better economic policy decisions in order to achieve prices stability.

That is why, in an effort to find new indicators that could help economic authority, this study found in economic theory, a basis to focus on the output gap as a possible indicator of inflationary pressures. As the Spain Bank (2010: 80) mention "the potential gross domestic product (potential GDP) and the output gap can be useful tools to control the inflation rate". Additionally, those indicators can be effective to evaluate public policies made in previous periods and provide the economic authorities a good background to generate economic policies in advance (Astorga, 2003:5-47).

There are many definitions about the potential GDP as well as approaches about the methods to estimate it. However, Arthur Okun (1963) was the first to define it. Nevertheless, from an overall perspective, Stiglitz and Walsh (2004:170-171) easily mention that 'the potential GDP measures the productive capacity of an economy maximizing the use of production factors in the medium and long term without inflationary pressures'. In that way, the gap between the real GDP and the potential GDP is called output gap, and it can reflect if the economy is operating over a potential level (positive output gap) or below (negative output gap). This information can be very important before to apply any monetary or fiscal policy in order to achieve price stability. For instance, if the inflation rate increases when the output gap is negative, the increasing of the inflation rate is likely due by temporary factors, such as political or social events, where restrictive monetary or fiscal policy might be not applied. On the other hand, if the inflation rate increases when the output gap is positive, the increasing of the inflation rate is due by

structural economic factors, where restrictive monetary or fiscal policy might be applied in order to slow down the prices.

Unlike many countries, Ecuador currently does not calculate the output gap nor analyzes its relationship with inflation.

For the Ecuadorian case, there are two studies about the estimation of potential GDP and the output gap, which were developed by analysts from the Central Bank of Ecuador; the first one was published in 1995 and was conducted by Salvador Marconi and Pablo Samaniego; and Alfredo Astorga and Angelica Valle published the second analysis in 2003. However, none of these studies analyzed the relationship and dynamic between the output gap and inflation. In this sense and with these limitations, the purpose of this research is appropriate.

Theoretical expectations between these two variables, historical events and macroeconomic variables will be valuable information as real evidence to know if the output gap can be a useful indicator as a rough guide to take into account before to generate future public policy to monitoring and control inflation in advance.

1.5. POLICY IMPLICATION

As it was mentioned before, adopting dollarization removed the monetary policy as an instrument to motivate the economic growth and control the price level. Fiscal policy has remained as the only instrument to control inflation. However, in a scenario of high inflation rate, applying a

contractionary fiscal policy can be good and effective to reduce inflation, but at the same time, it can bring an anti-growth effect. As Joseph Stiglitz (2003:84) mentioned, “Fiscal austerity, pursued blindly, in the wrong circumstances, can lead to high unemployment and a shredding of the social contract. ". Therefore, nowadays because the limitation of economic tools, the generation of appropriate fiscal policy is even more important. The Ecuadorian government must have enough information as a base before to generate a policy. This information can be obtained from technical tools, such as statistics, index, indicators, specific studies and researches.

In this context, this study wants to be one of the future bases to contribute in the decision making process to generate public policies to control the inflation. The findings of this research will be a technical support to show how useful can be the periodic calculation of the output gap as a key indicator to monitor the performance of inflation in the future. However, it is important to mention, that although the historical evidence does not have to be considered as a standard pattern for the future, it can be a starting point or complement to the other tools to generate public policies toward the monitoring of inflation rate in the future.

CHAPTER TWO

2 METHODOLOGY

2.1 TYPE OF METHODOLOGY

This research is fundamentally bibliographical. The used information linked to the referential framework comes from books, journals and websites, where it was possible to get all updated information to elaborate the theoretical basis within a scientific context. These theories provide a better empirical to support this study.

2.2 RESEARCH METHODOLOGY APPROACH

The research presents a qualitative approach. A descriptive analysis of historical data will be used to answer the research questions. It is also a qualitative approach because the dynamics and patterns between the studied variables (inflation and output gap) will be interpreted based on theoretical expectations, historical events and key macroeconomic variables that will help to understand the effect of other factors over inflation developments. The study starts with the calculation of the output gap by using statistical filtering techniques (which will be discussed later) and it continues dividing the period of interest by episodes of positive and negative output gaps, where the inflation dynamics are analyzed descriptively.

Because every research must have a scientific basis, this study is founded on logical positivism or neo-positivism, which reaches knowledge through experience more than verification. In this context, the inductive method will be used as a special and particular method, without reject other equally important methods during some sections within the research. For example, it will be useful the use of a method called "incomplete induction" which indicates that during a research developing, it is impossible to study all its elements and objects, which allows the study to generalize.

Another method that will be used is the "deductive logic". This is used to discover unknown consequences of known principles. This means that all the results obtained by applying the inductive method may be considered as premises to draw conclusions validated by rules of logical inference.

The "historical" method will be also part of this research because the historical evolution of inflation and the output gap will be shown during the period 1970 -2014 to analyze their dynamics, and relate them to theoretical expectations, historical events and key variables.

It is clear that the scientific method used in this research will have a neo-positivist structure complemented with specific methods, such as the complete induction, deductive logical method, analytical and historical.

2.3 METHODS AND VARIABLE IDENTIFICATION

The main basis for this research are the historical data of inflation whose source is the Ecuadorian Institute of Statistics and Census (INEC) and the output gap data that will be estimated using a filtering technique.

The descriptive analysis of the inflation dynamic will be developed for each episode of positive and negative output gaps. Each analysis is based on three aspects: economic theory, historical events and key macroeconomic variables. First, the economic theory is relate to the expectation that "positive output gaps generated inflationary pressures, while negative output gaps slow down inflation". Second, the historical events and key macroeconomic variables will help to understand that inflation dynamics may be affected in some other way by political, social or economic shocks. The macroeconomic variables for this analysis are: the unemployment rate and nominal wage, which are indicators of labor market developments; the oil price that is the main factor to affect the government income in Ecuador; the government expenditure; the nominal exchange rate, which might capture monetary driving forces of inflation; and "the policy interest rate, which serves as a proxy for the monetary stance and may pick up effects beyond standard aggregate demand and exchange rate channels" (Meier, 2010: 16),

However, as Meier (2010) mention, these variables are not fully exogenous to the inflation dynamics. The use of these variables is not to discover causal relationships, but to identify interactions to find possible deductive answers to the inflation behavior during each episode of positive and negative output gaps.

Table 2.3.1: Variable Identification

VARIABLE	VARIABLE DESCRIPTION
RESEARCH VARIABLES	
Inflation	Quantitative variable which measure the variation of prices index
Output gap	Quantitative variable which measure the gap between the Real Gross Domestic Product and Potential Gross Domestic Product
KEY MACROECONOMIC VARIABLES	
Unemployment rate	Quantitative variable which measure the percentage of economically active population (EAP)[2] who was unemployed during a reference period.
Nominal wage	Quantitative variable, which measure the annual average of the sum of the Unified Salary[3], the thirteenth and fourteenth pay compensations[4].

[2] The economically active population are all persons aged 10 years and over who worked at least one hour in the reference week, or had a job (employed) or those who were unemployed but were available to work (unemployed).
[3] The unified salary is the minimum legal amount of money paid to a worker in a month.
[4] The legal thirteenth and fourteenth pay compensations are extra amounts of money paid to a worker on December and august respectively.

Oil price	Quantitative variable which measure the annual average of oil price exported by "PETROECUADOR"[5]
Government expenditure growth	Quantitative variable which measure the annual variation of the total government expenditure[6]
Nominal exchange rate index	Quantitative variable which measure the annual average of the real-effective exchange rate index[7]
Legal Interest rate	Quantitative variable, which shows the reference legal interest rate in force to the corporate productive segment.

2.4 TECHNIQUES

In order to obtain the data for this research, the Ecuadorian Institute of Statistics and Census (INEC) calculates the inflation rate using the survey technique that will be explained later. On the other hand, because the lack of output gap data, the statistic - filtering technique "Hodrick Prescott" will be applied to estimate the data.

2.5 INSTRUMENTS

[5] PETROECUADOR is the oil public company of Ecuador.
[6] The total government expenditure is the sum of Current and Capital expenditures.
7 The sample to calculate the index contains 22 countries with the highest trade relationship in goods with Ecuador, excluding petroleum.

Two statistic computer programs will be used as indispensable instruments during the process of this research to achieve the main goal. They are SPSS and EVIEWS. The first software helps to obtain descriptive statistics of the variables, and the other helps to estimate the output gap using the filtering technique “Hodrick Prescott”.

2.6 DATA SOURCES AND TIME FRAME

The goal of this study is to describe the dynamics of inflation during past episodes of positive and negative output gaps from 1970 to 2014. In that sense, the inflation variable will be obtained from the Ecuadorian Institute of Statistics and Census (INEC) that is the government’s official institution to measure and publish the inflation rate monthly. The INEC calculates the inflation as the variation of Consumer Price Index (CPI). The Consumer Price Index (CPI) for Ecuador is a national-monthly index that measures changes over time in the general level of prices for the final goods and services consumed by households which reside in urban areas of the country and whose income levels are high, medium and low. The mainly investigated variable is the price of 299 articles that belong to a fixed basket established in 2004 from a national survey about households’ incomes and expenditures (ENIGHU). Through this survey, it was possible identify the goods and services most consumed by the majority of Ecuadorian people. These goods and services have different weights into the total basket in order to represent the Ecuadorian households’ consumption trends. Therefore, currently, the

base year to calculate the CPI is 2004. At this year, the index is equal to 100 (INEC, 2014: 17-39).

Nowadays, most countries use the CPI as the better inflation measure, which imply an advantage in terms of acceptability, validity and comparability.

The index calculation is based on Laspeyres formula which is a weighted average of relative prices, where the weights are estimated from the ENIGHU survey performed in 2003- 2004 as it was mentioned before. Therefore, the Laspeyres' mathematical expression is as follow:

$$I_{t,0} = \frac{\sum_{i=1}^{n} p_{i,t} * q_{i,0}}{\sum_{i=1}^{n} p_{i,0} * q_{i,0}}$$

Where $I_{t,0}$ is the price index for the period *t* with a base period 0; $p_{i,t}$ is the price of item *i* for the period *t* with a base period 0; and $q_{i,0}$ is the quantity of item *i* consumed in the base period 0.

On the other hand, currently in Ecuador there is not any official public institution, which publishes the output gap data, which imply another challenge for this research. As it was mentioned before, because the output gap is not an observable variable, it must to be estimated from available data using econometric methods. However, as Torres (2007) mentions, there is not a general-accepted method for its calculation. Nevertheless, the main goal of this study is not to find the better method to calculate the output gap. In this context, the output gap data will be estimated using statistical filtering

techniques, such as Hodrick Prescott. The use of this technique is based on the theory that the observed Gross Domestic Product fluctuates around the potential GDP. Therefore, the real GDP has two unobservable components. The trend component that is considered as the potential GDP and the cyclical component considered as the output gap. Using this theory, the Hodrick Prescott filter is an econometric procedure applied by using statistical software to separate the trend from the cycle of GDP.

The main reason to use this method of filtering technique is that data availability of real GDP, which is a very important factor as a starting point to allow the development of this study. Other methods equally important require many macroeconomic variables that currently are not available and require additional calculations, which would be a limitation for the development of this study. Consequently, the real GDP's data will be taken from the Central Bank of Ecuador (CBE) that is the governmental institution that officially calculates and publishes the nominal and real GDP quarterly and annually.

Finally, the key macroeconomic variables used in this study as a useful resource to explain inflation´s dynamics, such as, oil prices, nominal interest rate, nominal exchange rate, nominal wage, unemployment rate and government expenditure, will be also taken from the Central Bank's official statistics.

2.7 IDENTIFICATION OF POSITIVE AND NEGATIVE OUTPUT GAPS EPISODES

Once the output gap is estimated, a positive episode is considered as a period where the output gap values are positive for more than 2 years. Likewise, a negative episode is considered as a period, where the output gap values are negative for more than 2 years.

2.8 VALIDITY AND LIMITATION OF THE STUDY

This study is an existing data descriptive and historical analysis using time series data to notice the changes of inflation developments during positive and negative output gap episodes over time. However, this study is limited by data availability for variables of interest. First, the reason that the analysis starts from 1970 is that the Ecuadorian Institute of Statistics and Census (INEC) calculates the inflation rate since that time. It is not possible to obtain data before 1970, which limits the analysis only for 44 years. Second, there is not data of output gap, which allows this study to calculate them using a filtering technique mentioned before. This calculation implies to take the risk of not using the appropriate estimation method. Finally, for some macroeconomic variables used, the available time series commence after 1970s, such as nominal interest rate from 1975, nominal wage from 1979, unemployment rate from 1993 and nominal exchange rate from 1990. This data limitation restricts the descriptive analysis of those variables for some episodes.

In this context, the research findings are limited and linked to the period 1970 – 2014 as well as to the specific statistical method used to calculate the output gap. Additionally, it is important to mention that the patterns, dynamics and key features of inflation during positive and negative output gap episodes are qualified only by the observation and description, and they do not have to be generalized as a fix pattern for the future. However, it can be a valid starting point to take into account as real evidence before to generate public policies to control inflation. In addition, the findings of this research aim to encourage deeper revisions and future studies on the relationship between inflation and the output gap.

CHAPTER THREE

3 LITERATURE REVIEW

3.1 THE OUTPUT GAP

3.1.1. ECONOMIC GROWTH AND REAL GDP

Generally, Economic growth is a process, where economic activity increases, providing people more economic welfare. The real Gross Domestic Product (GDP) is the main economic indicator used to measure the economic growth. This indicator calculates the output of the country during a period and eliminates the prices influence.

In a chronological approach, there are many theories developed to find the factors that affect the economic growth or the real GDP.

Classical Approach

According to Adam Smith, David Ricardo and Karl Marx (in Rodriguez, 2005: 9), the economic growth depends on the labor force value. They agree that labor generates value and wealth, which translates as an output. They also argue that only through combination of labor force, machinery and natural resources, the economic growth is achieved. However, they conclude that while more capital and labor (population) are incorporated to the same land, marginal returns decrease.

Technological Progress Approach

This approach is attributed to Solow who appreciates the importance of technological progress within the economic growth process. Solow (in Rodriguez, 2005: 2) states that the investment or capital formation is not enough to achieve the economic growth. According his studies, capital, natural resources or land have a very few participation within the economic growth while technology progress is the main cause.

Human Capital Approach

Based on Solow´s studies, Theodore W. Schultz (1961) defined the labor force as a “type of capital, production and investment product” while Gary S. Becker proved the importance of education as a development factor (Rodriguez, 2005). Hence, their contributions built a new theory to explain economic growth as an effect of some factors, such as formal education, job training, health, fertility, family and migration. Both authors name these multiple factors such as "Human Capital".

Institutional Approach

This approach explains economic growth through the importance of institutions. According to Robert Barro and later Douglas North (in Rodriguez, 2005: 21 - 23) because economy is always dynamic, the institutions are very important actors to take into account within economic growth. Institutions built a structure of incentives for society, and they are determinants of economic performance. Consequently, for those who follow this theory, all

economic policies that do not take into account the important role of institutions are going to fail. Institutions govern not only society, but also the technological progress and human capital development.

Futuristic Approach

Peter F. Drucker is one of the pioneers in futuristic studies. He uses the terminology "the knowledge era". Nevertheless, many authors have contributed to this theory. According to this approach, the highly specialized knowledge is not only other resource of production, but also it is a key resource to generate economic growth. Peter F. Drucker (in Rodriguez, 2005: 28) recognizes that knowledge cannot be generated without traditional resources, but at the same time he states that knowledge is what determines labor productivity, output, real income and economic growth.

3.1.2. POTENTIAL GDP AND OUTPUT GAP

Arthur Okun (in Marconi and Samaniego, 1995: 3) was who introduced potential GDP concept for the first time. He considered potential GDP as the maximum output level that the economy can achieve through full employment of factors of production. However, many definitions have been developed over time. First, from a neoclassical perspective Potential GDP is considered as the long- term trend of the observed GDP. The Neoclassical econometric models take into account the price and wage flexibility, and try to correct long–term GDP imbalances. These propositions provide the possibility to decompose the observed GDP in two components: trend and

cycle; and associate the trend with potential GDP (Mauro, 2010). On the other hand, the Keynesian theory focuses its analysis on demand. The business cycle is the outcome of movements in the aggregate demand related to small movement in the aggregate supply [...] from the Keynesian view, the implementation of an economic policy to reduce unemployment by the manipulation of the aggregate demand is justified, since a higher level of output involves a lower level of unemployment (Miller, 2003). Therefore, from this theory, potential GDP is defined as the production level associated with an unemployment rate that does not generate the acceleration of inflation.

Later, under the Neoclassical Synthesis, the concept of potential GDP is redefined restrictively as the maximum output level that an economy can achieve without inflationary pressures. In other words, that is the highest output level taking into account price stability. This definition is usually adopted in an empirical analysis (Mauro, 2010).

Juan Cuadrado (2001: 229-230) describes the importance of potential GDP estimation as a tool to identify in the short term, mismatches that occur in an economy as a result of cyclical fluctuations; and, in the long term, a tool to set the maximum growth trend which can be achieved by an economy. From this concept and due to the need to know whether the economy is operating over or below its potential level, the concept of output gap emerges. The output gap is defined as the difference between observed GDP and potential GDP. Consequently, the output gap can be an indicator to capture economic fluctuations caused by long-term shocks or temporary factors.

The output gap is positive when the observed GDP is bigger than potential GDP, and it is negative when potential GDP is bigger than the observed GDP. Generally, the importance to study the output gap is due to its usefulness as an indicator of inflationary pressures due to its relationship with the short-run Phillips curve (which will be discussed later). Therefore, this indicator can be used as a complementary tool to generate public policies.

As Marco Vega (2010:10) mentions, that the output gap became popular after the Taylor rule (1993) was introduced to describe easily the monetary policy behavior of the US Federal Reserve in the 80's. This rule stated that the Fed tended to raise the interest rate when inflation was above its target, and the output gap was positive. Later, the literature about monetary policy combines the Taylor rule, inflation and the output gap as an ideal behavior of a central bank as a macroeconomic stabilizer.

3.1.2.1.ESTIMATION METHODOLOGIES

Potential GDP and the output gap are non-observable variables. Their definitions and values can change because of different methodologies used to estimate them. Each of these methodologies has advantages and disadvantages, as well as a high degree of uncertainty. Currently, as Torres (2007) mentions, there is not a generally accepted method. However, because the estimation of both indicators is very important to evaluate the economy performance, some methods are frequently used by many countries. These methods are listed below such as the most important ones:

Simple Peaks

Among the empirical methods to quantify potential output, the method proposed by Denison is the most simple one as Astorga (2003) mention. Denison (in Marconi and Samaniego, 1995: 3) proposes to choose two maximum points ("spikes") of the real GDP time series, in which he assume there are full employment of factors of production and the economy is operating at its potential. Those two points have to be joined through a line. Therefore, Denison mentions that for a given point of time, potential GDP is the found value in the line drawn between the two peaks.

The "output – capital" ratio

This method was developed by Schuldt in 1992 (in Marconi and Samaniego, 1995: 21). In this approach, the first step is to find the maximum ratio between output and capital (GDP / capital stock) for the period of analysis. This maximum ratio implies the highest use of production capacity and full employment in the economy. Therefore, potential GDP is the outcome of multiplying the maximum ratio by the final capital stock for each year as Marconi (1995) restates.

Production Function

It is a structural theoretical method developed by Solow. His methodology regards that economic growth is affected by labor, capital, human capital and technology. According this approach, these factors can be expressed by a function of production to estimate potential GDP. For this

purpose, the function of production “Cobb- Douglas” is the most used by Central Banks and international institutions because this function assumes constant returns, substitutability of factors and a stable growth as Astorga (2003) mention. Additionally, it allows the proper use of different economic reasoning for each country's economy.

Simultaneous econometric models

This method uses full simultaneous systems of equations based on theoretical relationships that describe the behavior of economic variables such as employment, productivity, output and inflation (CBO, 2004). The parameters of these equations can be estimated using statistical techniques. From this approach, the structural vector autoregressive models (SVAR) are one of the techniques frequently used to estimate potential output.

Statistical filtering techniques

Martner (1999) mentions that this method assumes the observed GDP fluctuates around potential GDP, which can be defined as the trend of the observed GDP. Therefore, in order to separate short-term fluctuations from the long-term trend, many statistical filtering techniques can be used, such as Hodrick Prescott and Kalman.

3.1.2.2. ESTIMATES FOR ECUADOR

For the Ecuadorian case, there are two studies about the estimation of potential GDP and the output gap. The first one is the work of Salvador

Marconi and Pablo Samaniego, which was published in 1995. This empirical research, used the “Simple Peaks” method of Harrod-Domar, which despite its lack of economic fundamentals, was successful in the sense of coherence between the estimation values and the Ecuadorian reality. This study shows that the economy would have been at full employment, except in 1983 and 1987, where the economy was affected by external shocks. In addition, the economy had wasted around 1.2% of their production capacity in the period 1965-1994.

Later, in 2002, Alfredo Astorga and Angelica Valle, technicians from the Central Bank, made a new estimation of potential GDP using nine methodologies. This study concludes that the economy would have operated below its potential level from 1950 to 1970. After this period, the situation changes because of the oil boom and the output gap becomes positive until the eighties, where the gap was negative again and it intensified its level in 1999 due to the financial crisis. After 2000, the Ecuadorian economy begins to stabilize and the negative output gap (potential GDP bigger than observed GDP) starts getting shorter.

3.1.3. STATISTICAL FILTERING THECHNIQUE “HODRICK PRESCOT” TO ESTIMATE THE OUTPUT GAP

The use of the filtering technique “Hodrick Prescot” as a method to estimate potential GDP and implicitly the output gap are frequently used by

many countries because the simplicity of its calculation and the facility to obtain available data of observed GDP. Additionally from the experience of the latest study about potential GDP for Ecuador, Astorga and Valle (2003) mention that the filter "Hodrick Prescott" was the method that provided better estimation results than others. Its outcomes successfully reflected the evolution of economy in coherence with the main historical events during the period of analysis.

In this regard, due to these advantages and since the purpose of this study is not to find the best methodology; this research will use the filtering technique "Hodrick Prescott" to estimate potential GDP and the output gap.

The Hodrick - Prescott filter is not only a filtering technique or method to estimate potential GDP and output gap, but also it is used to smooth time series. This filter decomposes a time series y_t in two components: trend and cycle.

In this sense, when the filter is applied to the real GDP, the trend component is considered as potential GDP. The Hodrick Prescott can be described as the solution to the following minimization problem.

$$\min_{\{y_t^P\}_{t=1}^{T}} \sum_{t=1}^{T} (y_t - y_t^P)^2 + \sum_{t=2}^{T-1} [(y_{t+1}^P - y_t^P) - (y_t^P - y_{t-1}^P)]^2$$

Where y_t is the natural logarithm of observed GDP for the year *t;* and λ is the Lagrange multiplier that establishes the restriction to obtain a smooth series of potential output. In this context, λ is an exogenous parameter whose value is arbitrary, but usually chosen based on the literature of real business cycle with a typical level of 100 for annual observations, 14400 for monthly observations and 1600 if they are quarterly.

Nowadays, several statistical computer programs facilitate the use of the Hodrick - Prescot filter, such as STATA and EVIEWS.

3.2. THEORIES OF INFLATION

3.2.1. CONCEPTUAL DEFINITIONS OF INFLATION AND ITS LEVELS

Inflation

Inflation as a general concept is the variation of the general level of prices of goods and services in the economy over a period, and it is commonly involved in all economic theories and process. As Schwartz (2009) restate, that the most used method to know the inflation rate is through the calculation of the Consumer Price Index (CPI), over time. The CPI measures the changes in the cost living. Generally, a household survey is used to know the changes in the commodities prices. These goods and services are relevant for an average family and aggregated to the calculation of the CPI 'by constructing a

weighted average of individual price changes' (Morley, 1971:9). Therefore, in order to make all goods and services comparable, the price index is calculated since a base year.

Once the inflation is calculated, it can adopt different levels, such as an ideal inflation, high inflation, hyperinflation and deflation. However, generally the distinction of each level could be imprecise, as well as to depend on each economy and their symptoms.

Throw the development of the economic thinking, many theories have appeared trying to understand and explain the cause of the economic phenomenon of inflation. In an overall perspective, there are three main theories. Monetarism, Keynesianism and Structuralism. From them many sub theories and debates have been founded. The Monetarists believes in the money supply power over the prices level, the Keynesians pay attention on the productivity factors and their total use as the only way to generate inflationary pressures, and Structuralists argue that there are political and social factors, which play an important role in the inflation process.

Ideal Inflation

Beckerman (1994) call an ideal inflation as a hypothetical concept where the price level of goods and services is generally expected. People are not surprised about the prices rise, so there is high certainty about future inflation. Therefore, an ideal or moderate inflation tend not to generate tragic

effects, but as Hirschman (in Lindberg and Maier (1985, 75) mentions, it can be a starting point of future effects.

High Inflation

A high inflation occurs when the price level of goods and services turns out higher than had generally expected. Beckerman (1994), states that an unexpected increase of inflation can favor certain economic agents and harm others. For instance, most of the cases because high inflation, firms tend to earn higher profits because the output prices increase, but on the other side, workers, financiers and suppliers tend to loose purchase power.

However, in general terms as Morley (1971) suggest, an inflation rate increase means the loss in purchase power of one currency unit. Additionally, Beckerman (1994: 25) notices that 'A high inflation rate generates massive economic waste. To carry out the additional planning, forecasting, bargaining, and transacting required by high inflation, an economy must expect energy that could otherwise be used productively'. In other words, a high inflation requires the government attention and good public policies; otherwise, the economic system can operate inefficiently.

Hyperinflation

There is no consensus on the definition of hyperinflation. It is difficult to determine the limit value when a high inflation runs out of control and becomes hyperinflation. As it was mentioned before, the distinction could depend on each economy and its own symptoms. However, most

economists follow the concept of Philip Cagan (1956) who defines hyperinflation when the monthly *inflation* rate exceeds *50*%.

Additionally as Beckerman (1994) mention, a very high inflation generate an uncertainty for a long term without horizon, which disrupts production and distribution.

Deflation

According to the IMF, deflation is a prolonged decrease of the price level of goods and services in an economy. This drop should occur for at least two semesters

3.2.2. INFLATION AND MONETARISM

First, Jean Bodin mainly formulated the background of Monetarist theory. His studies in the sixteenth century were focusing on rising prices in Europe. He and many authors mainly explained the prices increasing as a consequence of precious metals flow from America to Europe. They concluded that the money value depends on its supply instead of its denomination. However, many interpretations were made by different authors until Bernardo Davanzati formulated the quantity theory as a theory of money demand. For the Monetary Theory, the purchasing power of money depends directly and proportionately to their quantity. Therefore, a monetary supply expansion causes currency devaluation, and the increase of the prices. This model was accepted by all classic and neoclassic authors to the forties.

Nevertheless, nowadays, bankers, entrepreneurs and capitalist governments consider it as a principle to formulate economic policy.

Because of the development of economic thought through the history, the monetary theory can be understood by two particular approaches: Fisher's Transactions, which establishes a relationship between the quantity of money M, the velocity of money V, the volume of transactions T, and the price level. Consequently, price variations or inflation depend on M variation measured by the total volume of transactions generated within the economic system, therefore Irving Fisher arrive to the following expression: $P = (V/T) M$. (Brand, 1987: 30). The other approach is called "Cambridge Cash Balance". This approach developed by Cambridge economists, Marshall and Pigouthe, is wider and more complex to explain the prices variation because it integrates the concept of real national income (Y) as well V is defined as the velocity of money income. They argue that the sum of individual money demands form a macroeconomic money demand, which has to be proportional to the real national income. Therefore, the money supply growing is the sum of the real national income and inflation rate, resulting in the following relationship: $P= M – Y$.

Yet, some weakness of the monetary theory can be found. First, the main policy implication is that the economic authorities should ensure that money supply is effectively controlled, because controlling the money supply means that inflation can be controlled. For many economists, the money supply control can be difficult because it is not ease to measure it, as well as

control new forms of money introduced in the economy. Many authorities usually find the control of interest rates as an easier method to control inflation. Secondly, in the specific case of economies that do not have their own currency, this theory implies a huge limitation to control inflation.

3.2.3. INFLATION AND KEYNESIANISM

The 30's economic crisis, the classical thought and monetary theory was criticized because its poor effects in the economy specially to control the growing unemployment at that time. Given this scenario, J. M. Keynes developed the Keynesian as a theoretical discourse about the economic policy decisions that governments should make to overcome the classical economic theory limitations, and 'help the capitalist world to go out from recession' (Brand, 1987: 79).

Keynes introduce assumptions related to the effective demand, however, such a demand continues to play the key role in motivating price levels. Consuegra (2000) notices that while Monetarists see the whole quantity of money as a total demand, Keynesians think that just part of money supply becomes effective demand. The most important argument in this theory is the explanation of inflationary pressures as a consequence of full use of resources or productivity factors. Therefore, for Keynesians, it is impossible to experience inflation and underutilization of resources at the same time.

Over time, Keynes theory has had many variations, from which two approaches can be specified. The inflation approach, which implied prices flexibility and full employment, and the productivity approach where the analysis is focused on prices, productivity and nominal wage. In that way, the approach of prices flexibility and full employment can be notice in the study of "Phillips Curve", and the approach of inflation and output can be understood with "The New Keynesian Phillips Curve (NKPC)".

3.2.3.1. PHILLIPS CURVE

The original Phillips curve is associated with the empirical work in the 50s of AW Phillips (1958) who took the theoretical basis of R. Lipsey (1960) and found an inverse functional relationship between changes in nominal wages ($\hat{W}$) and the effective rate of unemployment (U), resulting in a Phillips curve of negative slope. Santomero and Seater (in Torres, 2003) explain that when the demand exceeds supply and the unemployment rate falls, the unemployment is negatively associated with excess in labor demand. Conversely, if the excess of labor demand is positively related to wage increases, then inflation will be negatively related to the unemployment rate. Therefore, Phillips Curve can be synthesized by the following equation:

$$\hat{W} = a - bU$$

Where a is a constant and b is a coefficient that capture nominal wage changes based on the current unemployment rate.

Later, other studies replaced the nominal wage by the inflation rate and the unemployment by the economic activity, where inflation is linked with economic growth. From a rational expectations approach, the Phillips curve provides a stable relationship Inflation – Unemployment, which allowed Samuelson and Solow (1960) notice that the current economic authority can chose a combination of inflation and unemployment as a public policy. For instance, government can tolerate some inflation in exchange for lower unemployment. At the same they state that to reduce the price level, it is inevitable a higher unemployment rate.

Rudd and Whelan (2005) noticed that the Phillips Curve theory was a great support for Keynesians. They also agree that managing the aggregate demand through fiscal policy, is a powerful instrument to decrease inflation. Therefore, Keynesians conclude that an expansion of public expenditure is justified only when the economic resources are sub utilized.

As it was mention before, later studies, related the Phillips curve with inflation and economic growth. From this contribution, it was possible to differentiate “Short-Run” versus “Long-Run” Phillips Curve. First, in the short run, ‘prices increases could increase output because the price increase enabled businessmen to increase nominal wages while still allowing real wages to fall. Because the inflation was unexpected, this situation induced higher than equilibrium labor supply and labor demand, a happy but temporary state of affairs’ (Morley, 1971: 102). On the other hand, in the long run this process changes. As Morley (1971) explains, inflation is not

unexpected because this is fully forecast, which has not any effect over labor market (wage and employment). The only factors that can affect to determine the real wage and employment level are labor supply and labor demand. If there is a wage increase, more people will look for a job, but employers will not be able to increase the salary because they do not experience an increase in their prices. Then, because there is not an incentive of wage increase, no additional people will look for a job, which imply only one level of unemployment called "natural unemployment". This term does not mean a fixed number in reality, but on the Phillips curve because the market conditions are given, at any point in time with any change in wages, the unemployment level is the same.

From the short-run Phillips curve analysis, new studies developed the concept of “The New Keynesian Phillips Curve”, which shows a relationship among current inflation, expected inflation and output gap (Torres, 2003).

3.2.3.2. THE NEW KEYNESIAN PHILLIPS CURVE AND INFLATION – OUTPUT GAP RELATIONSHIP

Since the Philips curve is considered as an instrument to the Keynesian theory to make policy decisions, many studies were developed later by Fisher, Phelps, Taylor, Rotemberg (1982, 1987) and Calvo (1983). They contributed to capture the link between inflation and output estimating a new Phillips Curve called “The New Keynesian Phillips Curve (NKPC)”. In

this curve 'the current inflation is a function of past inflation, expected future inflation, and the contemporaneous marginal cost of production' (Meier, 2010: 5).

$$\pi_t = \phi^b \pi_{t-1} + \phi^f E_t[\pi_{t+1}] + \lambda mc_t$$

Where π_t is inflation between periods *t-1* and *t;* mc_t is the deviation of real marginal cost from its steady-state value; and ϕ^b, ϕ^f, and λ are parameters. Specifically, λ > 0 is a function of the frequency of price adjustments—the more often firms adjust prices, the higher is λ, and hence the more responsive is inflation to current marginal cost.[8]

According to this theory, with competitive labor markets, the real marginal cost has a direct relationship to the output gap, which implied a linear link between inflation and spare economy capacity.

$$\pi_t = \phi^b \pi_{t-1} + \phi^f E_t[\pi_{t+1}] + \theta\,(y_t - y_t^*)$$

Where θ is the output gap parameter that shows the relationship between inflation and output gap. Therefore, because this relationship, the inflation rate will increase over time if real GDP remains above its potential level.

[8] For a better understanding, see Galí and Gertler (1999).

Since the development of this modern macroeconomic theory, the output gap starts to have an important role and contribution to explain inflation. Thus, the NKPC sees inflation as behaving according to the spare capacity of economy.

Therefore, from this theory, a positive output gap, where economy is operating over its sustainable level, will lead to inflationary pressures; excess in consumption and investment, and finally government might apply contractionary policies. On the other side, a negative output gap that shows an economy is operating under its ideal level, likely will bring low inflation levels even deflation. This scenery could push the government to apply expansionary policies to stimulate the economy and achieve price stability.

However, even though this theory tries to explain inflation in an innovative way, different economists have found a few weaknesses within the NKPC model. First, from a strictly econometric point of view, Ma (2002) and Mavroeidis (2005) notice the problem of weak instruments. They mention that in order to identify the statistical parameters, instrumental variables are needed, which are typically scarce. This problem can lead to choose weak instruments and generate imprecise outcomes as Kleibergen and Mavroeidis (2008) mention. Secondly, André Meir (2010) take into account a problem related to omitted dynamics and possible nonlinearities. He mentions that a single-equation cannot capture the dynamics and possible nonlinearities between inflation and output gap. However, in practice, 'output gaps could have a disproportionate effect on inflation when they are large in absolute

terms; and their effect might be greater or smaller for negative than for positive output gaps' (Meier, 2010:6). Moreover, similarly to all econometric models concern, other factors or key variables can independently affect inflation. These factors and variables are not considered by the NKPC, so it makes the estimation 'suffer from omitted variable bias' (Meier, 2010: 6).

All these problems could be enough to describe a weak relationship between output gaps and inflation, but as André Meir (2010) mention, these difficulties can also be a good motivation to develop empirical studies through variables description, observation and theoretical associations, rather than structural econometric models.

3.2.4. INFLATION AND STRUCTURALISM

Structuralism emerged as an approach designed for developing economies, especially in Latin America. R. Prebisch (1948), Sunkel (1958), J. Olivera (1967), Pinto (1968) and Pazos (1972) made the first contributions to this theory. For structuralists, the increase in inflation is not an effect of accidental situations, movements in other economic variables such as interest rate or the amount of money in the economy; or lack of government attention. This theory suggests that the cause of inflationary pressures is due to strong changes in the social and economic structure of a country (Hirschman in Lindberg and Maier 1985). These structural changes are generally associated with development processes or imbalances (Roca, 1999). For instance, 'inefficient agricultural sectors unable to respond to higher demand, rapid

urbanization, inadequate availability of foreign and domestic inputs, distorted industrial structures, and monopolized markets' (Beckerman, 1994: 33). In fact, the Structuralists admit a positive relationship between inflation and economic growth, but 'often amounts to substituting a sociopolitical problem, such as land tenure, excessive state intervention, and so on, for the economic problem of inflation' (Hirschman in Lindberg and Maier 1985, 57).

Later, Sunkel, Pazos, Assael and Ramos developed further studies in the early 90s. Their contributions pay special attention to analyze the government policies against structural inflationary pressures. Authors agree that any public policy seeking stabilization has to include orthodox instruments, such as correcting the fiscal and external accounts and reducing the monetary growth rate; and heterodox instruments, such as price controls, monetary reform or social agreements.

3.3. INFLATION AND RELATED MACROECONOMIC VARIABLES

3.3.1. INFLATION AND LABOUR MARKET (Unemployment and Nominal Wage)

The inflation process has a very important impact on the labor market. Price changes make workers and employers react immediately, and generate shifts on wage and employment levels. In a short-term, the rise in prices

decreases unemployment because employers can afford to raise the nominal wage, and unemployed workers are willing to work and motivated to accept the new wage offer without pay attention to the real wage. However, in a long run, workers realize that the wage growth was a compensation for the price increase and it does not represent a rise in the real wage. It thus, the economy adjusts to the new reality of the labor market and the decrease of unemployment is temporary until the wage rises achieves the equilibrium level W/P (Morley, 1971).

In the labor market, contracts are usually long period, which imply that employers are worried to forecast the future price changes to determine the quantity of workers needed and their salary, at the point to be efficient and prevent future losses.

Therefore, because the important role of inflation in the labor market, inflationary policies by the governments to increase employment are always taken into account since unemployment is 'a real quantity representing lost real output and underutilized human resources' (Hall, 1982: 219). For instance, a government spending policy can cause a rise in prices, decreased unemployment and a reduction in real wages. Consequently, as it was mentioned before, government can tolerate some inflation in exchange for lower unemployment.

3.3.2. INFLATION AND INTEREST RATE.

The interest rate and inflation have a very close economic dynamic. When the interest rates increase, individuals tend to consume less, stop borrowing money, and inflation goes down because the demand reduction in the markets. On the other side if interest rates decrease, individuals tend to borrow money and consume more. Consequently, this overconsumption brings that inflation goes up

It thus, interest rates are usually important as instrument of monetary policy for controlling inflation. For instance, with higher interest rates, government can expect to limit the spending of consumers and encourage long-term investment. However, as Brown (1983) mentions, there is evidence that interest policy has been effective enough to combating inflation for many countries, but there is also evidence that interest rates are not an effective instrument for inflation stabilization. Therefore, because expectations and economy symptoms, the effects of interest rates as a policy can varying from country to country.

Currently the interest rates are calculated by Central Banks. In the case of Ecuador, the referential and maximum interest rates are published weekly. The calculation is based on weighted averages of the rates that national private banks have used to lend and attract resources every week.

3.3.3. INFLATION AND EXCHANGE RATE.

Exchange rates are considered as an important factor to promote or control an inflationary process. Exchange rates represent the external value of

a country´s currency in relation to others. It thus, exchange rates generate not only national effects, but also regional and global. Generally, these effects are related to changes in the price level.

Changes in external values of currencies can be either a devaluation or appreciation depending on the government goals. A devaluation process occurs when the value of the currency decreases as compared to other currency, but if this value increases, it is known as appreciation.

However, governments mostly use devaluation as an exchange rates policy to spur exports competitiveness because in foreign market, national goods will be cheaper, which increases exports, as well as national income. Conversely, in the domestic market when there is devaluation, the national currency loses purchase power, which makes the prices of goods and services more expensive (inflation goes up). Additionally, because import prices rise, the government tries to limit imports 'more drastically than had changes in relative prices, or even changes in relative real incomes' (Brown, 1983: 271).

In the case of developing countries or economies that are primary producers, Stambuli (2011) mentions that they have a high dependence of foreign exchange, and usually they use devaluation to magnify the public sector net cash requirement to manage the debt service payments. Nevertheless, this policy increases the money supply and creates a cyclic inflation.

On the other hand, as Brown (1983) notes, inflation can be also affected by other countries' depreciation, especially under essential conditions, such as the existence of a free foreign exchange market ruled by supply and demand; and the powerfulness of this market to generate an impact in the labor market. Otherwise, in most of countries foreign exchange rate itself does not have a significant effect on the inflation process.

3.3.4. INFLATION AND OIL PRICES

Oil price has a very important effect over inflation, especially for those economies, which are highly dependent on oil exports, such as Ecuador´s economy.

Nevertheless, from a global perspective, real evidence has shown that an oil prices reduction is more beneficial to the world economy because the level of spending of oil importers is bigger than the declined level of spending of exporters. Additionally, lower oil prices bring lower production costs and a good motivation for other industrial sectors from which oil is an input (Husain et al, 2015).

Conversely, in a short term, an oil prices growth implies a direct increase in the price of its derivatives, as well as in a long term, some industries can experience a rise in their production costs, which increases the goods prices (higher inflation) and affects to the consumer budget.

However, for an oil-exporting country, the revenues from oil exports are the most important item of government income. It thus, a decline in oil

prices represent a significant reduction in fiscal revenue, as well as it limits the government spending and even it can bring a fiscal deficit, which can stop any inflationary process. Nevertheless, in a long run, government will face its deficit by increasing the money supply whether by debt or by issuing money. This money supply growth will generate an inflationary process as the Keynesians argue.

Rojas, Samaniego and Lafuente (1995) suggest that in Ecuador case, the imbalance in fiscal accounts is due mainly by structural factors, such as the high dependence on oil resources. Therefore, significant variations in oil prices generate a great impact in the Ecuadorian economy. The government deficit or surplus rapidly change the prices level and promote the generation of expansionary or contractionary fiscal policies.

3.3.5. INFLATION AND GOVERNMENT EXPENDITURE.

In overall terms, the government expenditure is very important to determine the development of economy. It is consider as an instrument of fiscal policy, and the use of it depend on country´s deficit or surplus. Nevertheless, the increases in the government income or expenditure are usually associated with a growth of the quantity of money circulating in the economy. There is thus a considerable increment in the domestic savings and consumption, which makes inflation increase.

The national income or expenditure can play two roles, as consumption expenditure or as non-consumption expenditure. Public authorities can determine the proportion of each according the country goals.

The government consumption expenditure has a direct and rapid effect on inflation because it increases the money supply by purchasing final goods and services, paying compensations to employees and spending on national defense and security.

Nevertheless, the non–consumption expenditure does not spur inflation directly, but it has also an impact on the rise of price level. The non–consumption expenditure is mostly used to create more income that can be re-spent in the future (Brown, 1983). As Aschauer; Barro and Sala-i-Martin (in Choi and Devereux, 2005) mention, the government uses this kind of expenditure on public goods, infrastructure, and capital formation, which helps attract capital inflows, promote the production capacity and lead to faster economic growth. Economists usually call this process as the multiplier effect.

Conversely, a neoclassical approach suggests that the multiplier effect can be transitory and in a log-run, there are persistent effects. Government spending today will increase future taxes, reduce consumer demand, reduce interest rates and increase labor supply, which will bring the rise of the marginal productivity of capital and will promote investment (Ramey and Shapiro; Burnside, Eichenbaum, Fisher, Devereux and Love; Barry and Devereux in Choi and Devereux (2005)).

On the other hand as Brown (1983) mention, budget deficits can stop government expenditure today, but later, governments will increase the supply of money by the creation of money or debt, which also involves large inflationary process. However, Fischer, Sahay, and Végh; Catão and Terrones (in Choi and Devereux, 2005: 7) notice that 'Recent analyses of cross-country data suggest that the positive association between fiscal deficits and inflation is strong among high-inflation and developing countries but not among low-inflation and industrial economies'

3.4. ECONOMIC POLICY INSTRUMENTS AND INFLATION

Public Policy

There are different approaches to define public policy by many scholars. However, in general terms, public policies are considered as coordinated actions and strategies by governments to draw the path, which will lead to achieve the country's public goals. In other words, a public policy is a decision-making process to meet the needs of societies, improve their lifestyle and increase the development growth.

Nevertheless, as Hamlett and Ramesh (1995: 5) recognize, non-governmental actors, such as organizations, interest groups individuals and social groups also play an important role during a public-policy process. It thus, decisions taken by governments have to consider internal and external issues joining the state and societal actors together before setting a public

policy to achieve a goal that has to be relevant and congruent as Jenkis (1978) in Hamlett and Ramesh (1995: 6) suggests. The author also highly the importance of evaluating public policies as a useful feedback for future decision-making process that can be more effective and efficient.

As Knill and Tosun (2012: 15) note, public policy can be classified based on a variety of approaches, such as the subject of interest. From this perspective, a public policy can adopt different names, e.g. environmental, social, economic or agricultural.

In this sense, within the economic structure, the government generates public policies to solve economic issues, especially economic growth, full employment and price stability. Those economic policies can also be categorized either as monetary or fiscal. This classification depends on the type of intervention as well as the instruments that will be used in the economic policy-making process.

3.4.1. MONETARY POLICY

Historically, monetary policy used to be implemented mainly to achieve full employment trough the expansion of strategic productive sectors. However, over time, monetary policy's focus has changed due to the increased interest by the governments in price stability (Ghosh, 2007:29). Nowadays, monetary policy is mostly used to achieve an inflation target considered as an ideal inflation for country´s economy.

Monetary-Policy makers may do some economic adjustments to influence the supply and demand of money through some policy instruments, such as changes in interest rates, exchange rates, government-issued currency, market operations, liquidity facilities, reserve requirements and direct controls (Laurens, 2005).

Generally, monetary policy is one of the main activities of a Central Bank (Sargent, 1999: 1465), but the discussion about whether the Central Bank should be independent or not from the government, is a topic of further debate that will not be addressed in this study. Nevertheless, the institution's independence is a political decision based on positive and negative impacts on each country´s economic structure.

Types of Monetary Policy

There are two types of monetary policy: expansionary and contractionary policy. Expansionary monetary policy's goal is to increase the money in circulation to spur production, consumption and employment, which can expand the aggregate demand. In this purpose, monetary authority may do some actions, such as money creation, changes in open market operations, reducing the reserve requirement, lowering the interest rates or even an implementation of currency devaluation strategy. Therefore, an expansionary monetary policy can be either a preventive or a responsive mechanism to the economic downturn, but it may also cause some inflation.

On the other hand, contractionary monetary policy's goal is to reduce the money supply to decrease price level or prevent future inflationary pressures. In this purpose, monetary authority may do some actions, such as, increasing the reserve requirement, increasing the interest rates, or changes in open market operations. Therefore, a contractionary monetary policy can be implemented in times of an overheated economy with high inflation, but it may also generate some side effects, such as unemployment and slower economic growth.

Monetary policy and Inflation

As it was mentioned before, the new economic perspective has changed. Currently, the economic authority looks at the monetary policy as a main resource to achieve desirable inflation targets.

'The demand for currency is proportional to the price level' (Sargent 1999: 1470). In this sense, the ability of the monetary authority to influence the price level and control inflation rests on keep the growth rate of currency low using monetary instruments. For instance, as Sargent (1999: 1471) mentions, if Central Bank uses seigniorage (government-issued currency divided by the price level) to achieve price stability , then the government budget must be also adjusted, which implies the intervention of fiscal authorities to manage expenditures, interest payments, tax collections and new interest-bearing debt.

Monetary policy limitations

As it was noted, monetary policy limitations to control inflation come from the government budget constraint, which emphasizes the importance of the interdependence of monetary policy and fiscal authorities (Sargent 1999: 1465). In other words, all monetary policy instrument used, have to be supported and strengthened by fiscal policy in order to achieve the economy requirements either to decrease, or to increase price level.

In addition, besides the fact that low inflation rates can generate a good economic environment for investors, it is also important to mention that low inflation rates that come from a very strict-contractionary monetary policy to restrict investment, can cause a negative impact on net investment (Daniel, Davis, Fauad and Van Rijckeghen 2006: 2).

Monetary policy in developing countries

In developing countries, monetary policy was focused not only to broad goals, such as economic activity and employment, but also to specific purposes, such as investment in specific production sectors, or poverty reduction (Ghosh, 2007: 29).

However, nowadays, to achieve inflation targets thought monetary policy as an exclusive tool is not just a practice of developed countries. Low-income countries also analyze their economic and social situation to estimate a desirable inflation target as a moderate price variation to ensure the economic growth process, but as Ghosh (2007: 34) notes, developing countries have to take into account that sometimes, an accelerated economic

growth in their economies is already linked to moderate inflation because supply constraints. Therefore, the author proposes that in the case of developing countries, monetary policy should be more focused on aspects, such as to prevent hyperinflation by sectorial imbalances; ensure the price stabilization to protect the economic growth process; generate support public policies that help to control the regressive effect of inflation and its impact on low-income people. Finally, the last author´s recommendation is to use monetary policy to monitor and control inflationary expectations.

3.4.2. FISCAL POLICY

As mentioned above, fiscal policies are another type of economic intervention or adjustments made by 'the executive and legislature' (Sargent, 1999: 1465) to accelerate economic growth, better income distribution and correct economic imbalances that may affect employment and inflation. Generally, fiscal policies are linked to revenue and spending. In this context, policy makers may do some adjustments using fiscal-policy instruments, such as changes in spending, public investment, debt, taxes, subsidies and tariffs. However, although fiscal policies seem to be highly related to government budget, they are also highly influenced by the political environment. It thus, both aspects define the effectiveness of fiscal policies (Mark Hallerberg, Rolf Strauch and Jurgen von Hagen in Joaquin Ayuso-i-Casals 2009: 127).

Types of Fiscal Policy

There are two types of fiscal policy: expansionary and contractionary. Expansionary fiscal policy is commonly used in times of economic instability as Keynesians recommend. The government will expand the money supply to stimulate and spur the country´s economy to increase the aggregate demand and reduce unemployment rate using fiscal policy instruments especially by increasing public spending or reducing taxes. However, an expansionary fiscal policy may also generate some inflation which can be a future problem, but at the same time it can be useful to 'help tackle deflation' (Daniel, Davis, Fouad, and Van Rijckeghem 2006: 12). That is why governments have to measure carefully their intervention in order to achieve an appropriate equilibrium between employment and inflation.

Conversely, a contractionary or discretionary fiscal policy is commonly implemented in times where inflation is getting high rapidly. The government will shorten the money supply to decelerate an over hated economy to reduce the aggregate demand and decrease inflation rate using fiscal policy tools, which would be an increase in taxes or an decrease in government spending. Nevertheless, as an opposite effect, the unemployment level may increase[9].

Fiscal Policy and Inflation

[9] For a better understanding, see section 3.3.1

Controlling inflation is one of the main purposes of fiscal policy. Generally, as it was mentioned before, an excessive spending or budget deficit raises national debt, which requires a government action to stop further debt and control inflation. Fiscal policy implementation, as Kirsanova, Leith and Wren-Lewis in Joaquin Ayuso-i-Casals (2009: 259) note, may spur changes in output and inflation. Cutting spending, or increasing taxes, are usually short-term instruments of fiscal policy to reduce debt, which minimizes any inflation effect. However, in a long run, governments have to apply further-consistent policies to reduce debt and control inflation in a sustainable way. The authors also mention that 'under the alternative path where the additional debt is eliminated, the output gap will be larger in the short term than in a long run, and a changing output gap tends to change inflation. So the path where debt disequilibrium is completely eliminated will also be more costly in terms of inflation.' (Kirsanova, Leith and Wren-Lewis in Joaquin Ayuso-i-Casals, 2009: 260).

Fiscal policy limitations

One of the big concerns about fiscal policy is the excessive spending, which later results in excessive deficits, debts[10] and 'the fragmentation of the budget process' (Mark Hallerberg, Rolf Strauch and Jurgen von Hagen in Joaquin Ayuso-i-Casals 2009: 129). A fiscal policy is a multi-task process because it implies a coordinated management of all different pockets of the

[10] For a better understanding, see section 3.3.5

government, which is difficult by the fiscal policy itself. (Sullivan and Sheffrin 2003: 248-250). In this sense, the fiscal policy has to be supported by monetary policy to enhance the effectiveness of governments' actions.

Fiscal policy for developing countries

In developing countries, where public spending is a big issue because their low-income public policy´s success highly depend on efficient governments with good governance system, fiscal transparency, responsibility and accountability. These are key elements to turn the government budget into substantial and satisfactory results. In developing countries, spending should be productive enough to improve human development, decrease poverty and inequality (Daniel, Davis, Fouad, and Van Rijckeghem 2006). Moreover, public debt should be managed responsibly in order to not be involve in a vicious circle, where public deficits never ends and further debt is needed[11].

3.4.3. ECONOMIC HISTORY AND INFLATION IN ECUADOR: 1970 - 2014

Period 1970-1980

In the sixties, Ecuador experienced the banana crisis, which was overcome due to the oil boom that started in 1972. The Arab-Israeli war brought an oil restriction to some industrialized nations, causing a significant

[11] For a better understanding, see section 3.3.5

readjustment of oil prices. Consequently, “Oriente”[12] crude oil raised its price from $ 2.5 in August 1972 to $ 4.2 in 1973 and $ 13.7 U.S. dollars in 1974. This oil price rise increases the flow of financial resources, which facilitated and speed the Ecuador's economy growth. At that time, Ecuador’s richness in oil was one of the main causes of high national debt. The amount of Ecuador's external debt grew almost 22 times, from $ 260.8 million Dollars at the end of 1971 to $ 5869.8 million at the end of 1981. The oil boom and massive foreign debt led to many huge changes. However, at the end of these transformations, the economic structure did not change, such as the accumulation process tied to exports of primary products, as well as the high level of property concentration in agricultural, industrial, commercial and banking sectors. (Torres, 2008: 7-8)

In this decade, the popular "model of import substitution" was adopted. In addition, greater trade openness was experienced with a severe foreign debt; processes did not generate better community lifestyle. Additionally, in this period, capital goods increased, domestic market expanded its operations and imports increased excessively.

The productive sector was facing a poor infrastructure and a shortage of skilled workers; besides protectionism by the state, which subsequently showed the weakness of the industrial sector and the failure of model of import-substitution model. At the end of 1979, Jaime Roldós Aguilera was

[12] Ecuador produces two varieties of crude oil: Oriente and Napo. Napo is a heavy, sour crude, with a 19.2° API and 2% sulfur content, while Oriente is a medium-heavy, medium-sour crude, with a 28.8° API and 1% sulfur content.

elected as the new president of Ecuador. This event brought the end of dictatorships in the country (Sandoval, 2014: 2).

Period 1980-1990

In the 80's, oil policy changed and some service contracts were signed. Since 1982, the deterioration of the economy started. The low oil prices, the review of developing countries' loans, and the territorial dispute with Peru; decreases the fiscal revenue and generates the first headaches in the economy. "Oriente" crude oil whose price increased over $ 30 per barrel in the early eighties: $ USD 35,2 per barrel in 1980 and $ 34,4 in 1981, to fall slightly to $ 32,5 in 1982, experienced a steady decline since 1983. That was the most critical moment for Ecuador. Additionally to the financial bubble' explosion almost all export prices from developing countries collapsed. However, despite all these external factors, it is impossible to hide internal factors that also contribute to generate the economic crisis (Torres, 2008: 8). In the early eighties, the country faces an economic crisis due to an excessive foreign debt (Debt Crisis) as well as other factors, such as an oil production reduction, the War of "Paquisha"[13] in 1981, and the climate phenomenon called "El Nino" in 1982-1983. Additionally, the president Jaime Roldós died in an accident on

[13] Paquisha is a canton in the province of Zamora Chinchipe, where Ecuador – Peru armed conflict took place in 1981.

May 24th, 1981, and Osvaldo Hurtado takes the power. His government is well know because "sucretizacion"[14] in 1983 (Sandoval, 2014: 4).

The following years, when Leon Febres Cordero was the new president (1984-1988), the neoliberal economic policies were prevalent. The main events of this decade were the low oil prices in 1986 and the earthquake in 1987 that caused the pipeline damage. Moreover, the political side can be characterized by a military insubordination and the formation of guerrilla groups. (Sandoval, 2014: 4).

As Orellana (2011) point out, in 1986 there was a negative shock because low oil prices, which hit the economy. In terms of trade, there was a 24% reduction, and the external sector crisis became evident in 1987, which brought an export reduction around 28.45%. (Orellana, 2011, in Sandoval, 2014: 5).

Period 1990-2000

This decade begins with a better economic control, desirable oil prices, the starting of flowers exports and the rising of shrimp production. Additionally, there was a greater incentive for the private sector and debt was renegotiated through the "Brady Plan"[15]. However, social events, such as the

[14] The mechanism for converting private debt into public debt. Private borrowers were able to exchange their dollar-denominated loans for new loans issued by Central Bank in Sucres while the Sucres were experiencing a rapid devaluation process.
[15] It was a refinancing strategy for the developing countries' debts, which implied substantial economic reform programs for those debtors agreed the plan.

first national indigenous riot in 1990, the natural disaster in "La Josefina"[16] in 1993 and the war with Peru in 1995; affected production levels (Gachet, 2010, in Sandoval, 2014: 5).

In the second half of this decade, the political instability and crisis were more remarkable, and a new monetary model was adopted. Moreover, Ecuador faced again the climate phenomenon "El Niño" in 1997-1998. The bank holiday and the deposit freeze (1999) were the main reason for new economic and social crisis that caused the migration of thousands of Ecuadorians (Sandoval, 2014: 6).

By the end of 1999, the economy decline around 7.3%, the inflation rate rose to 60%, money issuing increased around 150% and "Sucre" depreciation increased more than 190%. Domestic demand decreased 10%, which increased unemployment (16%) and underemployment (57%). This situation led to Ecuador to default on its Brady bond obligations (Orellana, 2011 in Sandoval, 2014: 6). In addition, wage levels were strongly affected. Approximately, the 50% of the economically active population earned less than the minimum wage, and because the fast "Sucre" devaluation, the minimum wage, which was $ 134.18 in January, became equal to $ 50 in December. Moreover, the external debt was 95% of GDP in the end of 1999 (Naranjo, 2005, in Sandoval, 2014: 6-7).

Period 2000-2014

[16] It is located in the city of Cuenca in the province of Azuay in Ecuador, where a big landslide took place in 1993.

In 2000, the dollarization was adopted and this policy stopped the excessive inflationary process at that time due to an untenable “Sucre “devaluation. Most people wanted to exchange Sucres for Dollars, as a good option to decrease the impact of inflation rising, which was 60.71% in December 1999, and 107.87% in September 2000. After that, this macroeconomic variable started to decline steadily. In the last ten years, the inflation rate has fluctuated between 3 to 8 percent annually showing a negative exponential trend (Armijos 2015: 1).

If dollarization had not been adopted in Ecuador, the inflation behavior would have been very different. Might be, the economy could experience hyperinflation similarly to Argentina and Bolivia with an inflation rate of 3079% in 1989 and 8170% in 1985 respectively, which brought severe social, economic and political consequences. Generally, these consequences mainly affect to the most vulnerable social classes, and it is important to mention that the worst tax for people is a high inflation rate (Armijos 2015: 1).

In January 2014, the average-monthly minimum income reached the value of USD 634.67. On the other hand, the value of the basic family basket, also kind of an Ecuadorian family was USD 628.27. The difference between these two values or gap theoretically should be zero, but in reality, it still exists. However, in the last seven years, this gap has been declining, from 22.03% in January 2008 to 1.01% in January 2014 (Armijos, 2015: 1). Additionally, the purchase power of families has increased steadily. In January 2008, family income covered around 77.97% of the cost of the basic

family basket, and in January 2014, the coverage percentage increased to 98.99% (Armijos, 2015: 1).

In another aspect, all public and private organizations plan the general budget for the next fiscal year (January to December) depending on the goals settlement by leaders (Armijos, 2015: 1).

Before dollarization, budgets lost force in one or two months maximum; and they had to be readjusted because the prices volatility of both consumers and producers. For instance, when a company quoted equipment, or any supplies on the market, the quoted price was valid for one or two days, so in that situation, it was impossible to run a scheduled budget. Consequently, budget controlling was difficult because excessive differences between the real and estimated budgeted (Armijos, 2015: 1).

Nowadays, public and private institutions plan and monitor budgets under a scenario with better certainty than before dollarization (Armijos, 2015: 1). Milton Friedman (1982) in his book "Unemployment and inflation" said: “The proximate cause of inflation is always and everywhere a monetary phenomenon resulting from and accompanied by a rise in the quantity of money relative to output. (...)”

One of the causes of high inflation rates is the inorganic emission of money, which means, printing more money using a machine in order to cover the state´s budget deficit without any backless from production. Consequently, if this happens, the money supply in the market will be higher than the

quantity of goods produced for consumption, which implies an excessive monetary supply versus insufficient production of goods and services demanded by consumers. In other words, people are holding a lot of money, but in the market there is a shortage of goods. This situation causes an imbalance between the quantity of goods produced and the amount of money offered in the market, which pressures the price levels to increase rapidly, and an inflationary process starts arising deterioration in the consumer's purchasing power (Armijos, 2015: 1).

If Ecuador leaves dollarization and the Central Bank issues its own currency, which could be Sucre again, or any other name, another historical mistake can be committed. However, this kind of decision has a high political risk, and it is the current government's responsibility does it or not, taking into account the severe consequences that can affect the majority of the population's economy (Armijos, 2015: 1).

In this context, nowadays, Ecuador does not qualify, social, economic or political to quit dollarization. Ecuadorians still remember the hard moments when the bank holiday brought the loss of citizens' savings and equity (Armijos, 2015: 1).

Ecuador, with an annual GDP of 100.917 million dollars and a per capita income of $ 6.297 in 2014 (Central Bank of Ecuador 2015), is having an inclusive growth, which has had an effective impact on reducing poverty and inequality levels. On the other hand, middle class has increased. From

2006 to 2011, 93.700 Ecuadorians became part of the middle class and 44.000 people left poverty (ECLAC, 2012).

However, at the end of 2014, 22.49% of population remains in poverty in terms of income, which shows the need of further progress in government work to ensure a sustainable and inclusive growth

In terms of inflation, Ecuador´s policy has been mainly through controlling prices of basic goods, which has reduced inflation progressively to sit Ecuador as one of the countries with the lowest inflation rate in the region. According to the National Institute of Statistics and Census of Ecuador, the annual inflation in 2014 was 3.67%. Ecuador with 16.027.466 inhabitants (2014)[17] has an active labor force of 7.4 million people, and an unemployment rate of 3.8%. Additionally, it is important to mention that in 2014, Ecuador was the eighth economy in Latin America with an economic growth of 3.8% in terms of GDP (Central Bank of Ecuador, 2015).

[17] Official forecast of the National Institute of Statistics and Census of Ecuador.

CHAPTER FOUR

4. DATA ANALYSIS

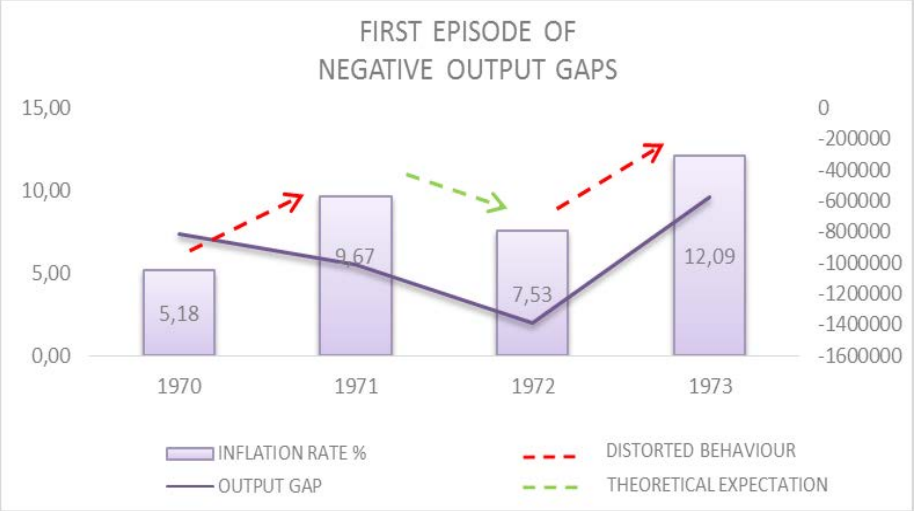
4.1. INFLATION AND OUTPUT GAP DYNAMICS IN ECUADOR : 1970-2014

This chapter aims to analyze the evolution of inflation in Ecuador during each episode of positive and negative output gaps, which were already, identify across 1970-2014 in order to verify the compliance with the base theory of this study: The New Keynesian Phillips Curve. Since this qualitative analysis is already aware about the importance to combine theoretical expectations and real evidence from society structure to explain social phenomena the numerical methodology is exceeded, also focusing on circumstantial historical, social and political events that significantly influenced the dynamics of the economy specially inflation.

This part of the research is divided into episodes of positive and negative output gaps from 1970 to 2014,where inflation dynamics is analyzed using not only theoretical expectations, but also descriptions of historical events of the Republic of Ecuador, which played an important role and influenced economy conditions in each episode identified

4.1.1 FIRST EPISODE OF NEGATIVE OUTPUT GAPS: 1970-1973

Figure 4.1.1.1: Inflation dynamics 1970-1973



Theoretical Expectation: A steady or decreasing inflationary trend

Findings: An increasing inflationary trend

Major historical milestones that distorted theoretical expectations:

1971: Oil export price increased in 6% from 3,4 to 3,6 USD, spurring the government expenditure strongly around 43,6% (current expenditure) y 160,7% (investment expenditure), which rose the quantity of money circulating in economy and consequently, inflation became higher.

1973 : Ecuador had the largest economic expansion in the national history because the oil exports of the country started during a situation of high prices in the international market. The export price of oil increased by 68% from 2.5 to 4.2 USD during this period, which increased the government expenditure at 31.4% (current expenditures) and 97.5% (investment expenditures), resulting in rising inflation.

During 1970 to 1973, there was an episode of negative output gaps, where according to the theoretical expectations; inflation should show a steady or decreasing trend. However, through this episode two inflationary increases can be noted. One in 1971 and the other in 1973. These theoretical pitfalls can be explained through the analysis of key factors that are beyond causal econometric relationships between economic variables.

This episode was characterized by a growing political volatility, significant increases in oil revenues –that increased the government current expenditure- and changes to international trade rules, as described below.

This episode has a very important background to highlight. In 1968, José María Velasco Ibarra, five times President of Ecuador, returned to the political power, at his last presidential term, but he had a narrow victory that was a sign of the decline of his political career. In a context of economic crisis and the subsequent social unrest, Velasco Ibarra abrogated the Constitution of 1967 and under this circumstance of constitutional absence, he continued the presidential term under a de facto regime. Despite his renewed efforts to re-establish a constitutional regime, an insubordination of the military that had been loyal until then, removed him from power in 1972. In 1970, the country´s situation was mainly represented by the no recognition of constitution, as well as civil and military dictatorships.

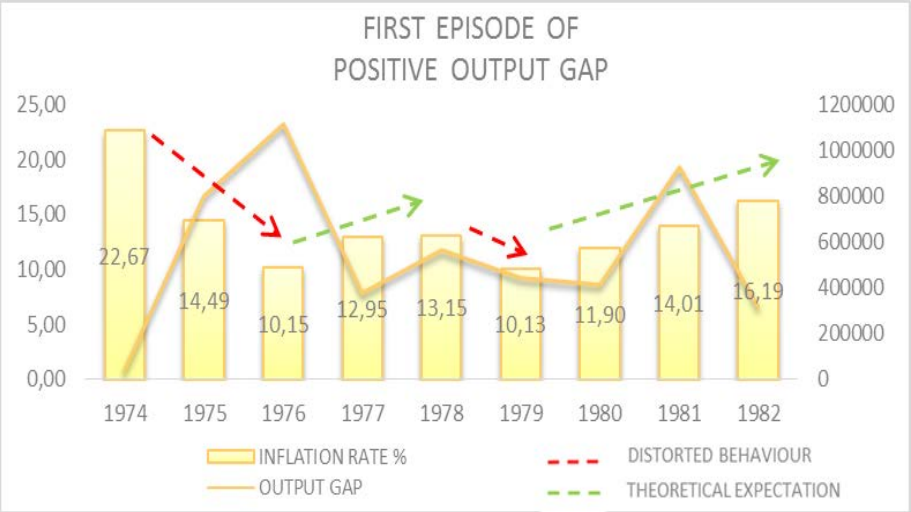
In the next year (1971), the unexpected-theoretical rise of inflation during an episode of negative output gaps was mainly due the high export price of oil that increased in 6% from 3.4 to 3.6 USD. It spurred the

government expenditure strongly around 43.6% (current expenditure) y 160.7% (investment expenditure), increasing the quantity of money circulating in economy and consequently, inflation became higher. However, in 1972, inflation decreases besides the beginning of a new Nationalist and Revolutionary Government led by General Guillermo Rodriguez Lara.

By 1973, Ecuador experienced an important historical event that affected economy and distorted again the expected path of inflation during a negative output gap. Inflation increased because of the largest economic expansion in the national history due to the oil exports and high prices in the international market. The export prices of oil increased by 68% from 2.5 to 4.2 USD during this period, which increased the government expenditure at 31.4% (current expenditures) and 97.5% (investment expenditures). However, this additional revenue was managed inefficiently since it was used for poorly planned strategy, pretending to achieve the state strengthening and the modernization of the productive apparatus.

4.1.2 First Episode of Positive Output Gaps: 1974 -1982

Figure 4.1.2.1: Inflation dynamics 1974-1982



Theoretical Expectation: An increasing inflationary trend

Findings: An increasing inflationary trend with two distorting periods (1975-1976 and 1979)

Major historical milestones that distorted theoretical expectations:

1975-1976: The country starts overcome the immediate effect of high oil prices. The economy slowed down and the economic indicators, such as inflation started to show their real level. Additionally a political instability can be noted.

1979: A political instability within a context of the return of democracy, the creation of new constitution and a presidential election process; create an environment of uncertainty. People react to limit consumption, which decrease demand and push the prices go down.

Following a chronological order, from 1974 to 1982, Ecuador's economy experienced an episode of positive output gaps. However, in 1975 inflation declined and showed a mismatch between real evidence and theory. This event can be explained and analyzed taking into account public policy

changes, the transition from a military and dictatorial government to a democratic and civil one, as well as economic aspects.

The General Guillermo Rodriguez Lara was dictator of Ecuador from 1972 to 1976. During this period, the country experienced a high level of government expenditure, related to the increase of the international oil prices and exports of this natural resource. This economic boom increased the amount of money in the economy, which raised the level of inflation until 1974. Additionally, this year was characterized by the growth of capital goods, the expansion of domestic market and a severe foreign debt. The process of imports substitution was an important public policy, related to obtain more economic resources to boost domestic production. This led to a new economic model, whose most evident impact was the increase of money supply and therefore, the increase of the inflation level in 1974.

However, in the next two years (1975-1976) even with a positive output gap, the inflation rate declined and theoretical expectation was left behind due to historical events, which are described below.

The oil boom in 70s placed 1972 as the best year in terms of oil prices. After that, the economy grew up extremely fast due to the huge increase of the national income at that time. However, because the economic growth was not due by any structural change, the shock-effect of high oil prices came down the next years. The country started to be adapted to the new conditions. The economic growth slowed down and economic indicators began to shown real levels, such as inflation. That economic dynamic, can explain the decrease of

inflation from 22.67% in 1974 to 10.15% in 1976 even during an episode of positive output gap.

Moreover, during 1974-1976, there were also political and social events that transcend economic and help to understand changes in inflation. Those events can be summarized as "Political Instability". As explained above, the Rodriguez Lara´s military government lasted until 1976. This government was characterized by rhetoric progressivism and protection of natural resources from foreign interests. This protectionist policy was implemented during the entry of Ecuador to the Organization of Petroleum Exporting Countries. However, public policy was not focused to solve major national problems, which caused a weak reputation of Rodriguez Lara, not only for civilian population, but also for senior officers of the Armed Forces of Ecuador.

On August 31st, 1975, social and political complaints against Rodriguez Lara's policies, caused a "coup d'état attempt"[18] , and an internal armed conflict known as "Guerra de la Funeraria" (Funeral Home War), characterized by armed clashes between military factions loyal to Rodriguez Lara, and those commanded by General González Alvear. Despite the violent environment of the insubordination, General Rodriguez Lara kept control of the government. After this event, González Alvear was exiled to Chile. This

[18] A coup d'état is a terminology to describe the sudden and illegal seizure of the power of the state in order to depose the legal regime or displace the government in order to replace it with a new ruling group, military or civil. Commonly, a military group is involved in a "coup d'état" due to its capacity to use force.

attempt of coup d'état definitely weakened the government of Rodriguez Lara, which significantly influenced country's economy.

Four months later from the coup d'état attempt, commanders of the Army, Navy and Air Force asked Rodriguez Lara to resign. On January 11th, 1976, Rodriguez Lara left his position and the Supreme Council of Government as a military triumvirate took the power.

The Supreme Council continued with military governance, limiting last government's progressive policies and carrying out acts of repression on workers. Additionally, based on high oil prices, the Council began an aggressive program of foreign debt in order to continue with import substitution policy whose main purpose was support domestic industry. However, it was not useful in any way. Public policy was not addressed to any important industry sector, but at the same time it gave support to the so-called, "false industry", which was focused on import business of intermediate goods with a little value added.

Therefore, inflation reduction (1974-1976) can be explained first by economy dynamics after a big impact of oil boom, and second because of political instability, creating an environment of uncertainty. It thus, people tend to change their expectations and limit their consumption, which decreases demand and reduces price levels in the market in a short term.

Later, in 1977 and 1978, the social and political phenomena had less impact over economy, which allowed an increase of the inflation rate, as well as fulfill of the theoretical expectation during a positive output gap.

However, in 1979, another inflation decrease was experienced by economy due to some political and social phenomena. On June 16th, 1978, the first presidential round was held amid doubts about the transparency of the electoral process. Without absolute majority for any of the candidates, a second round was developed on April 29th, 1979 and Jaime Roldós was elected as a president of Ecuador with 68.49% of the votes, which brought a new democratic process in the country.

After several years of dictatorship, important changes in Ecuador´s life happened. Capitalism and modernization penetrated deeply across the socio-economic structure, which caused a strong international dependence. Moreover, new social processes started, such as the unification of workers' syndicates into the United Workers Front, the creation of new political factions, which transcended traditional notions of left and right. These political groups focused on different political views, from social democracy to populism, generating followers and changes in the political scheme.

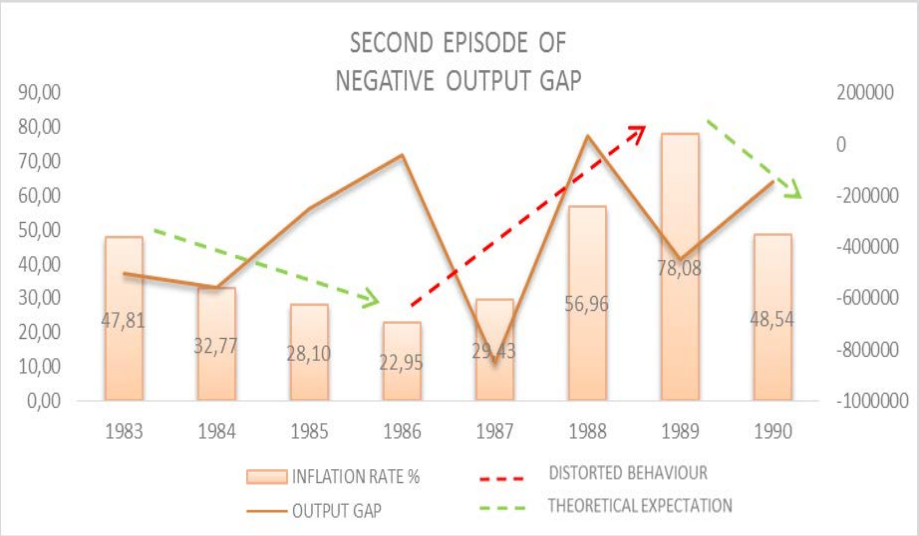
The "return to democracy" in 1979, was a crucial event for the Ecuadorian history. After years of military and civilian dictatorships, on August 10th, Jaime Roldós started his presidential term, and country's new constitution came also into force.

All of those political and social events generated an environment of economic and political instability with a high degree of uncertainty. Consequently, people felt worried about their future specially their jobs and economic status. This feeling of uncertainty made people react limiting their consumption and saving their money, which reduced demand and decreased the price levels in the market. Therefore, political instability affected economic behavior to explain the fall of inflation in 1979 even with a positive output gap.

In 1980, as it can be noted, inflation increased as a theoretical expectation during a positive output gap, which was also a side effect of important policies made at the end of 1979. At the beginning of the 80s, the political and economic model of progressivism was already worn, which caused the dominance of privatization in order to reduce the size of state and implement policy measures to adjust economy unbalances. However, two important policies played an important role in economic dynamics. First, on October, 11th, president Roldós ordered to reduce the weekly working hours from 44 to 40. Second, on November 1st, he doubled the minimum monthly living wage from 2000 to 4000 Sucres. Those measures influenced not only the labor context, but also generated a spike in inflation in 1980. The amount of money circulating in the economy increased, which encouraged domestic consumption, and made the upward trend of inflation continues during the next two years, keeping consistency with the positive output gap of this episode that ends in 1982.

4.1.3 Second Episode of Negative Output Gap: 1983-1990.

Figure 4.1.3.1: Inflation dynamics 1983-1990



Theoretical Expectation: A steady or decreasing inflationary trend

Findings: A decreasing inflationary trend with one distorting period (1987 – 1989)

Major historical milestones that distorted theoretical expectations:

1987: 1) Inflation increased as a side effect of an economic recovery after 1986 where oil prices decreased 51%.

2) An earthquake broke the pipeline and oil exports were suspended for six months.

3) Political instability by indigenous protest and the creation of guerrilla groups.

All these factors weakened the investment in the country, increased the government deficit, speeded up the inflationary process, and decreased real wages, which made the negative output gap wider

1988: 1) The annual inflation rate increased as a consequence of one-year positive output gap, where economy was re-boost thanks to the recovery of oil production.

2) The increase in the dollar, generated higher costs of imports specially, inputs and capital goods.

1989: 1) Inflation increased as a lagged effect of last-year positive output gap.

From 1983 to 1990, there was an episode of negative output gaps, where economy´s performance was below its potential, which made inflation follows a decreasing trend except in 1987, 1988 and 1989, years where economy was affected due to particular events.

During this episode, in 1983, there was a territorial dispute with Peru, which increased the State spending and committed the government attention to that issue to the detriment of other important fields of the country´s management, also connected to the decline of exports. Secondly, the country experienced an important historical policy called “Sucretización” that implied to convert external private obligations –established in U.S. Dollars to Sucres through the Central Bank of Ecuador. Consequently, the exchange rate differential was assumed by the state. The argument to make this decision was keeping the stability of the financial system. At that time, the inability of the private sector to pay its foreign debt could have caused the bankruptcy of businesses with the loss of thousands of jobs, as well as the collapse of local banks.

In 1984, neoliberal measures were implemented to help exporters and industrial sectors. Moreover, the openness to foreign capital and “Sucretización” increased the level of speculation. However, these adjusting economic policies encouraged the GDP´s growth, and created a surplus in the state’s budget from 1984 to 1985. Additionally, in the same period, terrorist groups appeared, and repressive policies were implemented to stop this threat.

In 1986, the country experienced a big fall of oil prices, from $ 27 to $ 8. Furthermore, during the same year a political instability became evident, when rebel military tried to kidnap the current president, who was able to keep the power.

From 1987 to 1989, the real evidence did not fulfill theoretical expectations about inflation, which increased despite of a negative output gap.

In 1987, this mismatch can be justified by three important reasons. First, inflation increased due to high oil prices, which helped to recover the economy from last year, when oil prices fell around 51%. This economic recovery increased the amount of circulating money, which beside a policy of real prices applied to the public services, caused the raise of living cost even more than families' income. Second, on March, an earthquake damaged the pipeline causing the suspension of oil exports for six months. Finally, another important reason was the political instability characterized by indigenous protest and the emergence of guerrilla groups. All these factors weakened investment in the country, increased the government deficit, speeded up the inflationary process, decreased real wages, and widened the negative output gap.

In the next year (1988), the annual inflation rate (56.96%) also increased significantly around 27.53 percentage points. It was a consequence of one-year episode of positive output gap, where economy was re-boost thanks to the recovery of oil production, and the implementation of economic

liberalization policies, such as the fixed exchange rate policy. Moreover, the government reduced its expenditure, but increased the foreign debt.

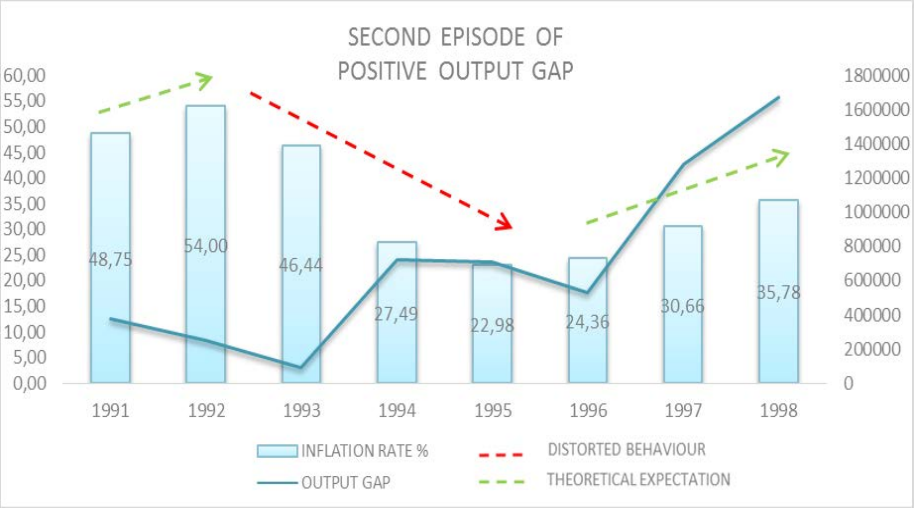
In the international scenery, the increase in the dollar, generated higher costs of imports specially, inputs and capital goods, which nudged the inflationary process even more.

In 1989, inflation continued increasing, as a lagged effect of last year. It thus, the price variation rose at a rate of 78.08% even with a negative output gap.

Finally, at the end of this episode (1990), the negative output gap matches with a decrease of inflation around 29.54 percentage points to reach the rate of 48.54%.

4.1.4 Second Episode of Positive Output Gap 1991-1998

Figure 4.1.4.1: Inflation dynamics 1991-1998



Theoretical Expectation: An increasing inflationary trend.

Findings: Two increasing periods divided by one decreasing period from 1993-1995.

Major historical milestones that distorted theoretical expectations:

1993 - 1995: 1) The new government settled the inflation reduction as a priority goal of its agenda

2) The Natural disaster of "La Josefina" affected national production

3) Monetary policy through controlling and managing exchange rate.

4) Monetary policy through providing more freedom to the finance system. The real interest rates decreased from 49% in 1992 to 56.5% in 1995.

5) Fiscal policy through a restriction on government expenditure and

Ecuador´s economy started a new episode of positive output gaps from 1991 to 1998. The expected increase of inflation in these eight years, was interrupted in the middle of the path, where inflation decreased in 1993 (46.44%), 1994 (27.49%) and 1995 (22.98%).

In 1991 and 1992, positive output gaps, brought an inflation rise. These two years were distinguished by a new agrarian reform and a new government led by Sixto Durán Ballén, whose policies were based on a modernization plan, the reduction of the size of the state and adjustment policies to eliminate fuel subsidies. Nevertheless, the priority goal of this government was to reduce inflation. The government was able to reduce thousands of public servants, maintain a stable monetary policy and boost the privatization of some strategic sectors. These public policies from a liberal thought, allowed the reduction of inflation in 1993 and the next two years, despite of a positive output gap. In more detailed terms, the government exercised monetary policy through controlling and managing exchange rate, as well as providing more freedom to the finance system, which experienced a decrease of real interest rates from 49% in 1992 to 56.5% in 1995. In addition, fiscal policy was characterized by a restriction on government expenditure and greater openness to the international markets.

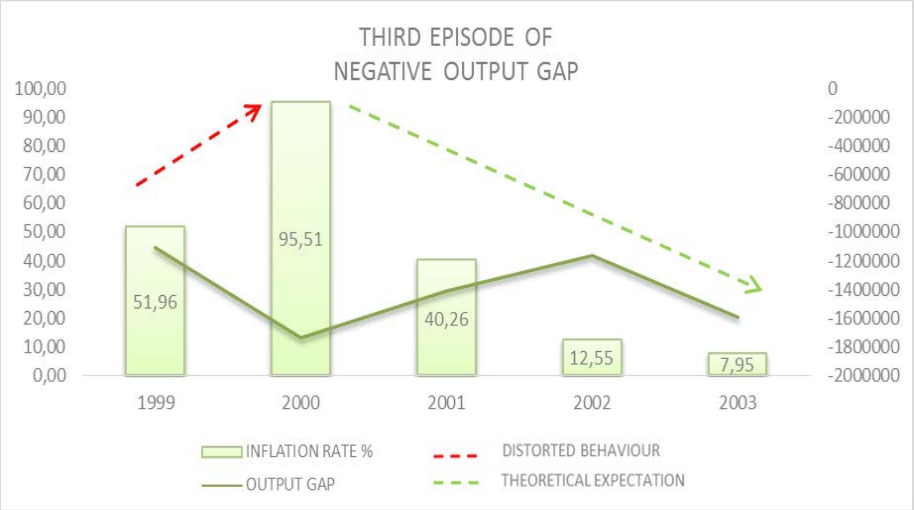
All these reforms were implemented through substantial modifications of the legal system in Ecuador. Another historical factor to take into account was the natural disaster of "La Josefina" in 1993, which

eliminated the source of water for the Paute Hydroelectric Plant, considered the largest in the country, at that time.

In the last three years of this episode (1996 – 1998), the inflation rate returns to its expected path and gradually increases until it reaches 35.78% in 1998. In the political arena, in August 1996, Abdalá Bucarám Ortiz, political exponent of populism, won the presidential election. This short presidential term (until February 1997) was characterized by major corruption scandals and informal public affairs with social and business sectors. On the other side, five aspects mainly defined the economic policy proposal of the government: A model of convertibility (4 Sucres per U.S. dollar), the negative flexibility of labor conditions, the elimination of free public health service as well as the subsidy on cooking gas, and the increase of fuel prices. As a result, social protests took place on February 1997, and Fabián Alarcón Rivera took the power until August 1998 under difficult circumstances, such as the decline of oil revenues, fiscal crisis, allegations of corruption and the negotiation of the border conflict with Peru. These complex political events helped the positive output gaps to speed up the inflationary process

4.1.5 Third Episode of Negative Output Gap 1999-2003.

Figure 4.1.5.1: Inflation dynamics 1999-2003



Theoretical Expectation: A steady or decreasing inflationary trend

Findings: A decreasing inflationary trend with one distorting period in 2000.

Major historical milestones that distorted theoretical expectations:

1999: 1) Bank holiday and freeze of deposits.

2) Exchange rate of 20,000 Sucres per Dollar.

3) Inorganic emissions of money by the Central Bank.

2000: 1) Exchange rate of 25,000 Sucres per Dollar

2) Dollarization process.

3) Civil protest and military insubordination

In 1999, the economy returns to experience an episode of negative output gaps, which ends in 2003. This period was characterized by a decreasing inflationary trend. Nevertheless, in 2000 the theoretical expectations changed about inflation behavior while the economy was operating under its potential.

As a background of this episode, it is important to mention that in 1997 the National Assembly made a comprehensive reform of the 1978 Constitution that came into effect on August 10th, 1998, the day that Jamil Mahuad took the power as the new president of Ecuador. Mahuad's government took adjustment measures that affected the majority of the population and benefited only the bankers and companies that had financed his campaign. The government allowed excessive flexibility on the rules of banking operation. Later, he ordered a bank holiday and freeze deposits in March 1999. This further action complicated the economic scenario of the country, reporting an exchange rate of 20,000 Sucres per dollar, which pushed inflation up despite an episode of negative output gap. This year was also influenced by a moratorium on foreign debt and several inorganic emissions of money by the Central Bank.

It thus, in January 2000, President Mahuad ordered the change of the monetary system of Ecuador, adopting the U.S. Dollar as the official currency with an exchange rate of 25,000 Sucres per U.S. Dollar. This economic policy called “dollarization” was considered anti-technical. In addition, the high inflation, the bank holiday, deposits freezing and the increase of

unemployment levels; generated significant civil reactions. On January 21st, 2000, indigenous groups and mid-range military officers removed Mahuad from his office. During this political chaos, a tripartite board governed Ecuador for a few hours. Later, with the support of Armed Forces, Vice President Gustavo Noboa took the presidential office.

Consequently, the severe economic and financial crisis in 1999 and the dollarization process, was the main reason of the positive price variation (95.51%) at the end of 2000, which changed the theoretical expectations. This process is likely one of the most important historical examples about how social and political shocks affect theoretical basis of economy. In 2000, during a negative output gap, it was expected a steady or decreasing inflationary trend. However, all the mentioned historical events, were able to distort the inflation behavior, and made it increase drastically at the rate of 95.51%.

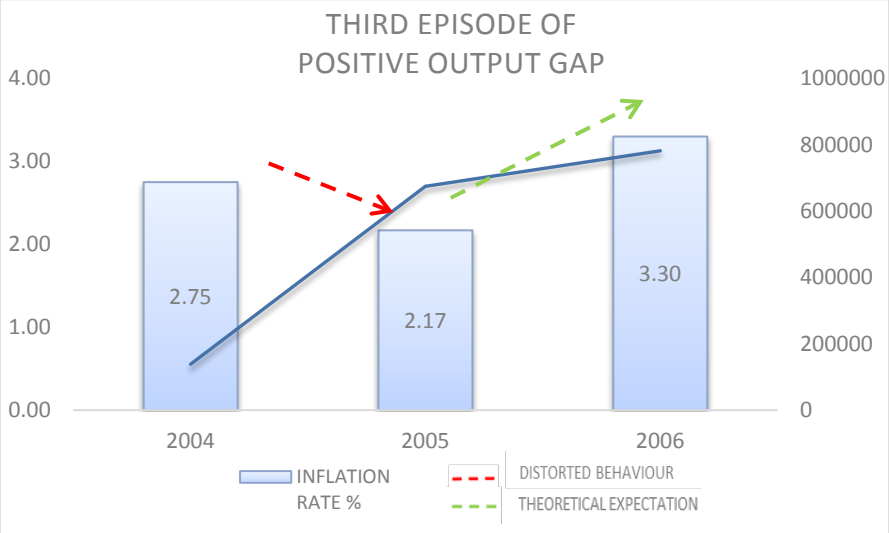
After Gustavo Noboa took presidential office, he established political and economic measures of appeasement, including keeping dollarization as a stabilization policy. He also initiated a policymaking process to reduce the high inflation rate, in line with the negative output gap of this episode. One of the policies was the renegotiation of the foreign debt, expressed in so-called Brady Bonds.

Finally, in 2002, after a remarkable economic stabilization symbolized by a significant inflation reduction, there was a new presidential election. Lucio Gutierrez Borbúa, who participated in the triumvirate to

remove the President Mahuad from the government, became President of Ecuador on January 2003.

4.1.6 Third Episode of Positive Output Gap 2004-2006

Figure 4.1.6.1: Inflation dynamics 2004-2006



Theoretical Expectation: An increasing inflationary trend

Findings: An increasing inflationary trend with one distorting period in 2005.

Major historical milestones that distorted theoretical expectations:

2005: 1) GDP growth declined from 7.9% in 2004 to 4.7% in 2005

2) The annual percentage change of exports declined from 15.8% in 2004 to 7,4 % in 2005

3) Weak government consumption

4) Foreign direct investment decreased from 837 to 483 millions of dollars

5) The underemployment rate increased to reach the rate of 47,3% of the economically active population.

6) Political instability with social protest and government overthrows.

In the next period, from 2004 to 2006, there was a short episode of positive output gaps, but in 2005, the economy slowed down and reported a decline of GDP growth from 7,9% in 2004 to 4,7% in 2005.

Although Dollarization strengthened country´s macroeconomic stability, the economic sovereignty and monetary policy instruments were lost, such as the control over exchange rate, used specially for devaluating process to promote exports, motivate domestic production and increase national revenue.

In this context, the presidential term of Lucio Gutierrez (From January 2003 to April 2005) started with short-term political alliances and without specific coordination on state action. Additionally, it was evident a commitment with the International Monetary Fund, through a Letter of Intent, asking president Gutierrez to raise the price of fuel, which brought a significant increase of the price of basic consumer goods in 2004.

In this year, the operations of the Heavy Crude Oil Pipeline (OCP) began. The economic growth reached the rate of 8.2% and the participation of the private companies in all stages of oil's business increased.

In 2005, there was a slight fall in the level of inflation. Real GDP decreased from 7.9% in 2004 to 4.7 % in 2005. Despite of the fall of real GDP, it remained bigger than the potential GDP, generating a positive output gap. However, inflation decreased due some particular events. The government expenditure was weakened due to a decline of exports from an annual

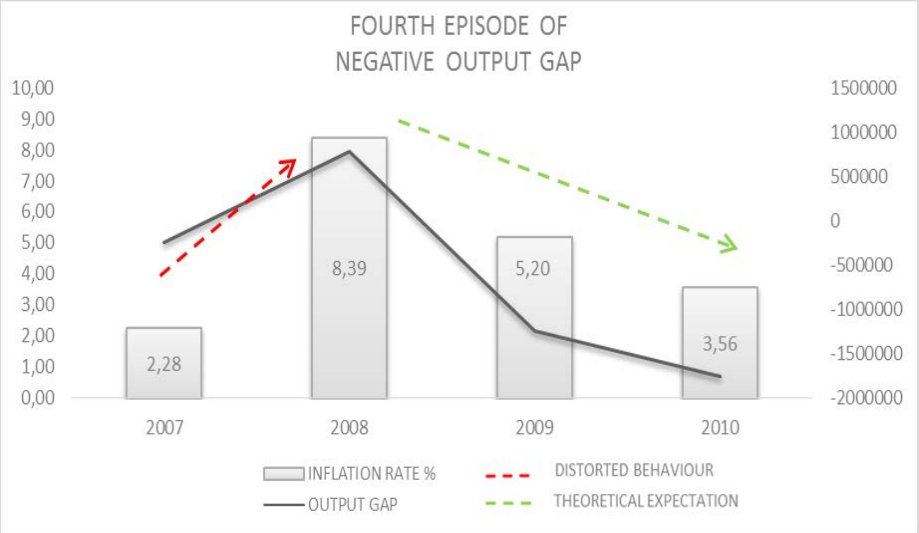
variation of 15.8% in 2004 to 7.4 % in 2005, as well as due to a decline of foreign direct investment from 837 to 483 millions of dollars, which decreased money supply, and consequently the reduction of price level. Additionally, in that year the underemployment rate increased to 47.3%. The informal labor sector characterized by poor conditions was the most affected.

In the political arena, 2005 can be also defined as a difficult year with social discrepancies about the management of public issues by the government. One of the most controversial issues was the illegal dismissal of the Supreme Court of Justice members to place politically loyal judges in order to annul the judgments of the ex-President Bucarám. Consequently, Ecuadorians had to face hard times in economic and political terms, which brought social protests and riots to articulate the way out of the president Gutierrez. Finally, in April 2005, Once President Lucio Gutierrez left office, the Vice President Alfredo Palacio took the power, but he had to govern with little popular support, which stopped his plan of "national reconstruction".

By 2006, inflation returns to its normal path because a positive output gap. Additionally, some economic events happened. First, remittances increased 18.7% compared to the last year, and oil exports rose from 5.397 million of USD in 2005 to 6.934 million of USD in 2006 (28.5% growth), which increased national income, as well as the median of family's primary income by 7.8%. Therefore, people increased their consumption, which pushed up demand, and inflation showed a positive variation in the economy.

4.1.7 Fourth Episode of Negative Output Gap 2007-2010.

Figure 4.1.7.1: Inflation dynamics 2007-2010



Theoretical Expectation: A steady or decreasing inflationary trend

Findings: A decreasing inflationary trend with one distorting period in 2008.

Major historical milestones that distorted theoretical expectations:

2008: 1) Positive output gap originated by the GDP growth at the rate of 6.4 %

2) High oil prices (83.4 USD) that increased around 39% compared to 2007 (60.2 USD).

3) National income increased

4) Current and capital government expenditure grew 75% and 68.5% respectively compared to 2007.

In this study term (1970 – 2014), the last episode of negative output gaps was experienced from 2007 to 2010, where inflation decreased. However,

this episode was interrupted by a positive output gap in 2008, when Ecuador's GDP surpassed its potential and generated an inflationary pressure to reach the rate at 8.39%. This significant positive variation was due to the influence of internal and external factors.

From 2007 until today, President Rafael Correa has governed Ecuador without major interruptions (except for the events of September 30th, 2010). In 2008, the inflation behavior changed due to a one-year positive output gap, which was suddenly caused by a greater GDP growth at the rate of 6.4 % due to high oil prices (83.4 USD) that increased around 39% compared to 2007 (60.2 USD). This event generated a national income increase, which allowed government to expand its current and capital expenditure around 75% and 68.5% respectively.

Additionally, in this year, the severe financial crisis of the United States characterized this year as a huge impact on global economy. The devaluation of the U.S. dollar influenced Ecuador's dollarized economy, which also nudged the increase of inflation. It thus, the government implemented some policies to control inflation and prevent further increases of two-digit rates. The government implemented an important policy through price controls in the domestic market. However, not only the international financial crisis affect inflation, but also it was due to two important events. First, the high oil prices even at 100 USD per barrel. Second, the strong winter affected some regions in the country, which push government to extend its expenditure to cover all the damages. Additionally, in the political

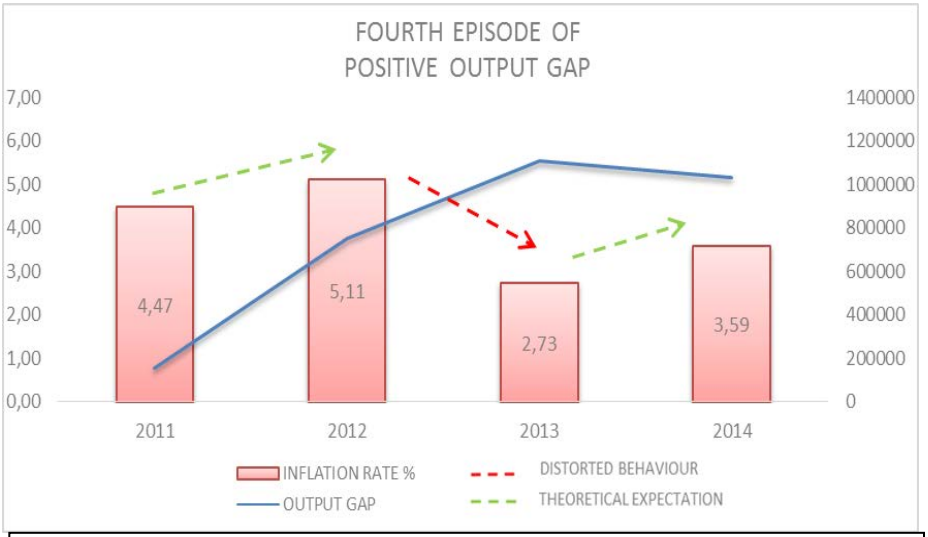
sphere, President Correa implemented several political reforms that led to create the Constituent Assembly, which issued a new constitution, currently in effect.

For the biennium 2009-2010, the slowdown of the global economic crisis and the effectiveness of government policies, stabilized markets and a spurred a wider offer of basic goods, which helped to control and decrease the rate of inflation in concordance with the negative output gap.

Finally, in 2010 there was important historical event, appropriate to mention. On September 30th, 2010, military and police groups protested violently against to the new Public Service Act, which reduced their income related with meritorious awards and other benefits. This situation threatened the security of the President for few hours. However, at the end of that day, the government could overcome this situation and President Correa returned to the presidential office. After that, any disruption has been experienced so far.

4.1.8 Fourth Episode of Positive Output Gap 2011-2014.

Figure 4.1.8.1: Inflation dynamics 2011-2014



Theoretical Expectation: An increasing inflationary trend

Findings: Two increasing periods divided by one decreasing period in 2013

Major historical milestones that distorted theoretical expectations:

1) The fall of oil revenues by 34% due to the closure of some refineries to repower them

2) Government deficit was financed by public debt that increased 22.5% compared to the last year. It was mainly foreign debt.

The last episode of positive output gaps was experienced from 2011 to 2014. Nevertheless, the theoretical expectation of a higher inflation was left behind in the middle of the path, when inflation experienced a negative variation in 2013.

This four-year period, was also under the tenure of President Correa, showing a positive output gap and two periods of rising inflation, keeping consistency between theory and facts.

In 2011, the progressive increase of oil prices, directly affected the amount of money circulating in the economy, increasing the consumption and boosting the public spending, both current and investment.

This scenario of high oil prices started in 2010 with the emergence of political and social movements known as "Arab Spring". This mobilization began with the uprisings in Western Sahara and has moved to countries like Egypt, Tunisia, Algeria, Syria, Yemen, Iraq, Libya, Morocco, Saudi Arabia, among others. As can be seen, the geographical area of this political phenomenon is located at the sub-Saharan Africa and the Middle East, where most of the oil business are concentrated. This situation significantly increased international oil prices, favoring Ecuador's economy.

After the economy recovery from the international crisis, in 2012, 2013 and 2014, Ecuador has experienced times of stabilization with an important economic growth, which has decreased progressively from 5.2% to 3.8% in terms of GDP. Additionally, public expenditure and investment has increased, especially to support social projects, as well as investment projects of energy infrastructure. However, in 2013, the price level experienced a reduction of 2.38 percentage points from 2012 (5.11%) to 2013 (2.73%), which was basically one of the effects of the fall of oil revenues by 34% due to the closure of important refineries to repower them. It thus, the government

deficit was financed by public debt that increased 22.5% compared to the last year. It was mainly foreign debt. Finally, in 2014 the economy dynamic behaved as the economic theory states. The excessive spending and deficit observed in the last year motivated the government to get further debts, which speed up an inflationary process, reporting an increase of 0.86% to reach the rate of 3.59%.

4.2 GENERAL FINDINGS OF THE ANALYSIS.

According to the previous analysis, the real evidence suggests that output gaps matter and influences inflation behavior, at least when there are not temporary shocks which lower or raise inflation below or above its theoretical expected rate.

The shocks which distort the expected inflation behavior during positive or negative output gaps are mostly related to historical events, such as political instability; initial inflation rates which are already very low or very high; dynamics of macroeconomic variables specially oil price, and government inflation targets.

Episodes of negative output gaps:

During historical episodes of negative output gaps, the evidence has shown that inflation generally fell, which follows the theoretical expectation of the NKPC. However, inflationary pressures can be noted in some cases, which arguably can be explained due to three principal causes. First, very low inflation rates at the beginning of the episode, which creates a greater

resistance to disinflation. For instance, episode 1 and 4, where increases in inflation become understandable because the initial rates are already low compared to other periods.

Second, an increase of oil prices strongly affects and raises inflation rate even during a negative output gap, which shows the high dependence of Ecuador's economy to this natural resource.

Third, an economic recovery from previous periods causes inflationary pressures refers to the argument that the reallocation and adjustments of factors effect of limiting disinflation during a episode of negative output gaps.

Episodes of positive output gaps:

As it was observed in the analysis, the inflation behavior during episodes of positive output gaps tend to show a gradually increase, which fulfills theoretical expectations. However, deflationary process can be noted in some cases, which arguably can be explained due to four principal causes. First, political instability during the history of Ecuador is an important factor to change theoretical expectations. Some political and social events generate a high degree of uncertainty. Consequently, people felt worried about their future specially their jobs and economic status. This feeling of uncertainty made people react limiting their consumption and saving their money, which reduced demand and decreased the price levels in the market.

Second, strict public policy aligned with official targets to decrease inflation. Real evidence has shown that when reducing inflation becomes part of government's agenda, all the monetary or fiscal policies implemented can highly stop the inflationary process as an effect of a positive output gap.

Third, during episodes of positive output gaps, disinflation can be noted when the initial inflation rate is already very high as a result of a heated economy in the previous period commonly due to high oil prices.

Fourth, when government experienced a deficit, it decreases its consumption and reduces money supply, which consequently lets inflation decrease.

Finally, the above observations leave open the question about how much longer disinflation or inflation might continue in the next period after an episode of negative or positive output gaps respectively. This consideration can be a good motivation for further studies to complement this study and obtain useful information in advance to monitor inflation.

CHAPTER FIVE

5. CONCLUSION AND RECOMENDATION

5.1. CONCLUSION

Policymaking may be weak or error, in which case its foundation or base information is limited and biased either to a scientific analysis of theoretical expectations, to political and social context, or to political judgment.

The exercise of policymaking implies the responsibility to take into account not only science, but also political and economic factors. Science, such as econometric models, cannot be always right or complete enough to explain social phenomena or changes in economy. Adapting the words of Atkinson (1997: 304) to this study, we have to consider not just the theoretical expectations of the inflation behavior, but also the social explanations of these episodic departures.

Science and social events, such as political, international or cultural, must be viewed as two interrelated sources and resources of same policymaking process. Since science or theoretical expectations implies in this case econometric models that simulate possible and causal relationships between variables of interest, and helps to have benchmarks about possible effects on the economy when the variables change. At the same time, social events imply real evidence not only from the present, but also from history.

History is the only way to understand society structure, its evolution and changes, as well as to learn from successful and failed policy experiences, in order to use them as a good example and point of reference for better public policies in the future.

Therefore, the two sources are not as separable as they might appear at first sight. Both of them are strongly interrelated to affect each other and consequently the decision making process.

In the specific case of public policies to monitor and control inflation that is one of the most important economic issues of governments, those should be design based on economic indicators, policy rules and considering each countries' social structure, as well as experience and real evidence of past periods. However in the case of Ecuador, inflation policies are supported by very little information, such as the Consumers Price Index (CPI) and the forecast of inflation using econometric models. This lack was the main motivation for this study to provide real evidence through a historical analysis of inflation and output gap; and conclude that the output gap calculation can be a useful-additional indicator to monitor inflation behavior in advance and improve the public policy process. Nevertheless, this study also conclude and highly the importance of taking into account social and political events, as factors which can distort the theoretical-expected behavior of inflation during episodes of positive and negative output gaps.

Findings:

1. The potential GDP measures the productive capacity of an economy maximizing the use of production factors in the medium and long term without inflationary pressures. The gap between the real GDP and the potential GDP is called output gap, and it shows if the economy is operating over its potential level (positive output gap) or below (negative output gap).

2. The New Keynesian Phillips Curve (NKPC) is a relatively modern macroeconomic theory, which shows the relationship between output gap and inflation rate.

3. According to the theoretical expectations from the NKPC, the inflation rate increases when the output gap is positive and it shows a steady or decreasing behavior when output gap is negative. However, according to each society structures, which are different, contradictory patterns, can appear due to temporary factors, such as political, economic, social or international events, where restrictive or expansionary monetary or fiscal policy might be not applied.

4. In Ecuador's case, theoretical expectations (NKPC) about inflation behavior during episodes of negative output gaps and positive output gaps have been distorted by historical events, such as economic, social, politic or international shocks.

5. In general, terms, during episodes of negative output gaps, Ecuador has experienced a tendential decrease of its inflation, which provides real evidence to confirm the theoretical expectations of the NKPC despite of some unexpected inflationary increases, generated by temporary and historical events.

6. In general, terms, during an episode of positive output gaps, Ecuador has experienced a tendential increase of its inflation, which provides real evidence to confirm the theoretical expectations of the NKPC despite of some unexpected inflationary decreases, generated by temporary and historical events.

7. Following a chronological order, from 1970 to 1973, Ecuador´s economy experience an episode of negative output gaps, where inflation showed a fluctuating evolution. The theoretical expectation of a steady or decreasing inflation rate is not accomplish in 1971 and 1973, where price variation increased around 4.49 and 4.56 percentual points respectively, compared to the years before. First, in 1971, the increase was mainly due the high export price of oil that increased in 6% from 3.4 to 3.6 USD, spurring the government expenditure strongly around 43.6% (current expenditure) y 160.7% (investment expenditure), which rose the quantity of money circulating in economy and consequently, inflation became higher. Second, in 1973, Ecuador had the largest economic expansion in the national history because the oil exports and high prices in the international market. The export price of

oil increased by 68% from 2.5 to 4.2 USD during this period, which increased the government expenditure at 31.4% (current expenditures) and 97.5% (investment expenditures), resulting in rising inflation. This economic impact became an important historical event which distorts the expected path of inflation during a negative output gap.

8. From 1974 to 1982, an episode of positive output gaps can be noted and the theoretical expectation is fulfilled in trend terms. However, in 1975, 1976 and 1979, inflation declined as a result of some historical pitfalls. First, in 1975 and 1976, prices variation decreases around 8.18 and 4.34 percentual points respectively compared to their last year. This theoretical pitfall, was mainly originated because the country starts to overcome the immediate effect of high oil prices in 1994, and economy slowed down. Economic indicators, such as inflation started to show their real level within a context of political instability. Later, in 1979, the reduction of inflation was an effect of a political instability within a context of the return of democracy, the creation of new constitution and a presidential election process; create an environment of uncertainty. People react to limit consumption, which decrease demand and push the prices go down.

9. In the next period, from 1983 to 1990, there was an episode of negative output gaps, where economy´s performance was below its potential, which made inflation follows a decreasing trend except in 1987, 1988 and 1989, years where economy was affected due to particular events. In 1987,

inflation rate was 29.43%, which represented an annual increase of 6.48 percentual points. This increase was a combined effect of three reasons. First, the 51% drop in oil prices in 1986 slow down the economy, so the inflation increase by the next year was a side effect of an economic recovery. Second, in 1987 was a very devastating earthquake that broke the pipeline and oil exports were suspended for six months. Finally, other important reason was a political instability characterized by indigenous protest and the creation of guerrilla groups. All these factors weakened the investment in the country, increased the government deficit, speeded up the inflationary process, and decreased real wages, which made the negative output gap wider. Additionally, for the next year (1988), the annual inflation rate (56.96%) also increased significantly around 27.53 percentage points, as a consequence of one-year episode of positive output gap, where economy was re-boost thanks to the recovery of oil production. Moreover, the increase in the dollar, generated higher costs of imports specially, inputs and capital goods, which nudged the inflationary process even more. This increase was also experienced in the next year (1989) as a lagged effect, where inflation rose at a rate of 78.08% even with a negative output gap.

10. In 1991, Ecuador´s economy started a new episode of positive output gaps until 1998. The expected increase of inflation in these eight years, was interrupted in the middle of the path, where inflation decreased in 1993 (46.44%), 1994 (27.49%) and 1995 (22.98%). The fall of price level during these three years, was basically because the new presidential administration

settled the inflation reduction as a priority goal of its agenda. For this purpose, monetary and fiscal policies were implemented strictly. First, the government exercised monetary policy by controlling and managing exchange rate, as well as providing more freedom to the finance system, whose real interest rates decreased from 49% in 1992 to 56.5% in 1995. In addition, fiscal policy was characterized by a restriction on government expenditure and greater openness to the international markets.

11. In 1999, the economy return to experience an episode of negative output gaps, which ends in 2003. This period was characterized by a decreasing inflationary trend. Nevertheless, the devastating economic and financial crisis in 1999 and the dollarization process, was the main reason of a positive price variation (95.51%) in 2000, which changed the theoretical expectation about inflation behavior, when economy was operating under its potential.

12. In the next period, from 2004 to 2006 there was a short episode of positive output gaps. Nevertheless, in 2005, the economy slowed down and reported a decline of GDP growth from 7.9% in 2004 to 4.7% in 2005, which limited government expenditure, decreased money supply, and consequently there was a reduction on price level where a mismatch between economic theory and real evidence can be noted. Additionally, in this year underemployment rate increased specially, the informal labor sector that is characterized by poor labor conditions.

13. The last episode of negative output gaps during the period of analysis of this study (1970 – 2014), was experienced from 2007 to 2010, where inflation decreased. However, this episode was interrupted by a positive output gap in 2008, when Ecuador's GDP surpassed its potential and generated an inflationary pressure (8.39%). This one-year positive output gap was suddenly caused by a greater GDP growth at the rate of 6.4 % due to high oil prices (83.4 USD) that increased around 39% compared to 2007 (60.2 USD). This event generated a national income increase, which allowed government to expand its current and capital expenditure around 75% and 68.5% respectively.

14. The last episode of positive output gaps was experienced from 2011 to 2014. Nevertheless, the theoretical expectation is left behind when a negative variation of inflation rate is experienced in 2013. This reduction of 2.38 percentage points from 2012 (5.11%) to 2013 (2.73%) was basically one of the effects of the fall of oil revenues by 34% due to the closure of some refineries to repower them. It thus, the government deficit was financed by public debt that increased 22.5% compared to the last year, and it was mainly foreign debt.

15. Through this analysis, it was evident that most of the mismatches between theoretical expectations and real evidence about inflation behavior

were due to oil prices variations, which shows the high dependence of Ecuador's economy to this natural resource.

5.2. SUGGESTIONS AND POLICY RECOMENDATION

1. The output gap is not only an economic indicator of economy growth. It is a complementary resource of government planning. Its dynamics with other economic variables, such as inflation, provide a great sense and better perspective to decide what kind of policies government should apply to monitor and control inflation in advance. Therefore, due to the current lack of this indicator in Ecuador, its calculation is highly recommended to improve the policymaking process in the country.

2. Because the potential GDP and the output gap are non- observable variables, they can be estimated from available data using econometric methods as well as different methodologies. In this context, it is recommended to do further studies to find the best methodology to estimate these indicators. The best methodology should be the one whose estimations fit better the Ecuador's reality and likely capture the main economic shocks.

3. The findings from this historical and descriptive analysis have shown that output gap is an important indicator to monitor the performance of inflation in advance. However, it is important to mention that the historical real evidence and past dynamics between inflation and output gap do not have

to be considered as a standard pattern for the future, it can be consider as a starting point or complementary tool to generate public policies toward the monitoring of inflation rate in the future.

4. Economic theories are an important guide for policymaking process in order to know the possible effects on economic variable changes. Nevertheless, science might not be always right or complete enough to explain social phenomena or changes in economy. In general, public policies should be design based on four main aspects: science, past evidence, social context and political judgment. First, science should be considered as a warning instrument of theoretical expectations. Second, past evidence is the only way to understand changes in society structure as well as to learn from successful and failed policy experiences. Third, social context provides the framework where some restrictions, conditionalities and specifications are given. Finally, political judgment implies intuitive and prudential skills from the government to integrate all the information and run a policymaking process.

5. In Ecuador, most of public policies designed to control inflation are based on econometric models, surveys and economic indicators, which are developed by technicians, such as economic engineers, economist and mathematicians, who bias their studies to the science side. Therefore, it is recommended to create multidisciplinary work teams, which were integrated by technicians and sociologists who can improve the economic analysis with

real evidence of past experiences (history) and take into account society structure, its demography and people expectations.

6. According to the findings, during negative output gaps without any social, politic or economic shocks; which can affect the smooth flow Ecuador´s environment; the economy has not threatened by any inflationary pressure. Therefore, the government should take this evidence as a guide to generate expansionary public policy to spur economy growth, which should not surpass the growth of potential GDP in order to prevent an overheated economy and future inflation increases.

7. According to the theoretical expectations and real evidence. In Ecuador, during positive output gaps within a smooth flow of social context, the economy operating over its potential has brought inflationary pressures. Therefore, the government should take this evidence to generate restrictive monetary and fiscal policy in order to slow down the overheated economy and nudge inflation back.

8. Economic theories and other countries' experiences about monitoring and controlling inflation should be reviewed periodically in order to update obsolete methods and information, find and figure out new useful indicators which facilitates the decision making process of economic authority.

9. Successful public policies experienced in other countries' economy, should not be adopted for others. However, they might be adapted to each country social, political and cultural context. Governments should be aware

that effects and outputs of policies already experienced are likely to differ due to different social structures among countries, as well as changes over time.

10. Before to design public policies to control inflation, it is highly recommended that all ongoing episodes that are forecast to future output gaps should be place in a historical perspective in order to have a broad perspective.

11. Due to the high dependence of Ecuador's economy to every change of oil prices, the government should keep running its national plan to change the matrix of production in order to enhance the industrial sector and progressively decrease the dependence to this natural resource. Otherwise, it can be dangerous for the country in the future due to the global economy is developing new sources of energy, which can decrease tremendously the price of oil steadily.

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ATTACHMENTS

Attachment I

Estimating the Output Gap as the difference between Real GDP and Potential GDP.

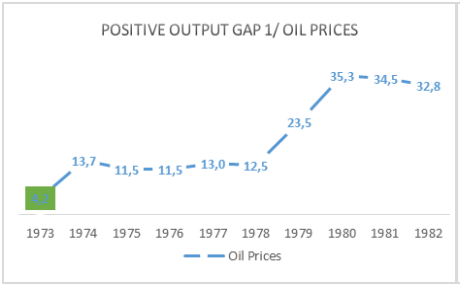
			miles OF USD 2007			
				H-P FILTER	Real GDP - Potential GDP	
		YEARS	REAL GDP	(POTENTIAL GDP)	OUTPUT GAP	INFLATION RATE %
First Episode of Negative Output Gap	6	1970	12260834	13077194,99	-816360,99	5,18
	7	1971	13032360	14042036,92	-1009676,92	9,67
	8	1972	13686277	15077574,77	-1391297,77	7,53
	9	1973	15595606	16173379,13	-577773,132	12,09
First Episode of Positive Output Gap	10	1974	17343641	17305107,61	38533,3855	22,67
	11	1975	19246612	18442640,1	803971,8961	14,49
	12	1976	20670320	19556241,82	1114078,183	10,15
	13	1977	21002046	20624217,69	377828,309	12,95
	14	1978	22200596	21636013,44	564582,5572	13,15
	15	1979	23029577	22584853,07	444723,9261	10,13
	16	1980	23883671	23469606,41	414064,5893	11,90
	17	1981	25224229	24293590,52	930638,4807	14,01
	18	1982	25379319	25064263,11	315055,8885	16,19
Second Episode of Negative Output Gap	19	1983	25293824	25798388,28	-504564,284	47,81
	20	1984	25957856	26515880,69	-558024,692	32,77
	21	1985	26979298	27231609,35	-252311,347	28,10
	22	1986	27914072	27954863,02	-40791,0174	22,95
	23	1987	27841747	28692407,35	-850660,354	29,43
	24	1988	29481756	29450600,1	31155,9022	56,96
	25	1989	29778277	30227292,39	-449015,389	78,08
	26	1990	30874092	31020646,92	-146554,924	48,54
Second Episode of Positive Output Gap	27	1991	32199005	31824336,25	374668,7521	48,75
	28	1992	32879792	32630567,35	249224,6462	54,00
	29	1993	33528582	33435293,92	93288,0758	46,44
	30	1994	34956313	34236961,89	719351,1127	27,49
	31	1995	35743721	35034950,05	708770,9476	22,98
	32	1996	36362712	35835830,74	526881,2602	24,36
	33	1997	37936441	36653263,98	1283177,021	30,66
	34	1998	39175646	37506178,61	1669467,387	35,78
Third Episode of Negative Output Gap	35	1999	37318961	38426335,25	-1107374,25	51,96
	36	2000	37726410	39462189,19	-1735779,19	95,51
	37	2001	39241363	40651121,96	-1409758,96	40,26
	38	2002	40848994	42013157,32	-1164163,32	12,55
	39	2003	41961262	43554221,43	-1592959,43	7,95
Third Episode of Positive Output Gap	40	2004	45406710	45268598,83	138111,1726	2,75
	41	2005	47809319	47134644,44	674674,5628	2,17
	42	2006	49914615	49132094,31	782520,6903	3,30
Fourth Episode of Negative Output Gap	43	2007	51007777	51247431,24	-239654,237	2,28
	44	2008	54250408	53474963,22	775444,7819	8,39
	45	2009	54557732	55806601,71	-1248869,71	5,20
	46	2010	56481055	58242012,62	-1760957,62	3,56
Fourth Episode of Positive Output Gap	47	2011	60925064	60768373,15	156690,8525	4,47
	48	2012	64105563	63355250,93	750312,0682	5,11
	49	2013	67081069	65973780,51	1107288,49	2,73
	50	2014	69631545	68602599,54	1028945,457	3,59

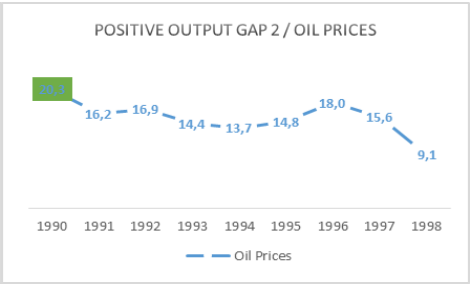
Positive Output Gap
Negative Output Gap

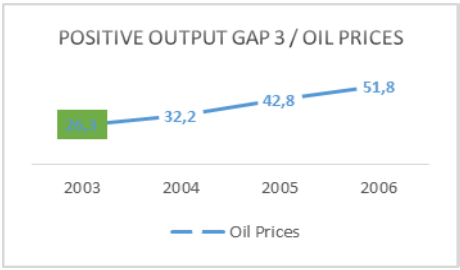
Attachment II

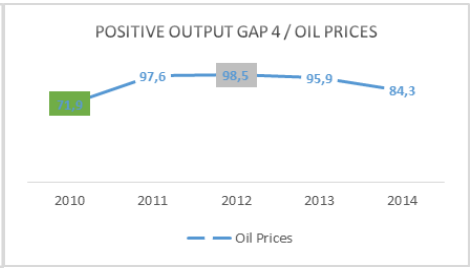
Macroeconomic variables during episodes of positive output gaps.

Oil Price

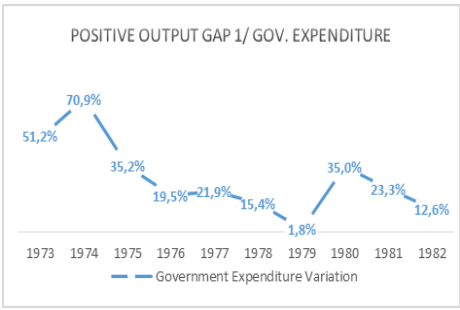


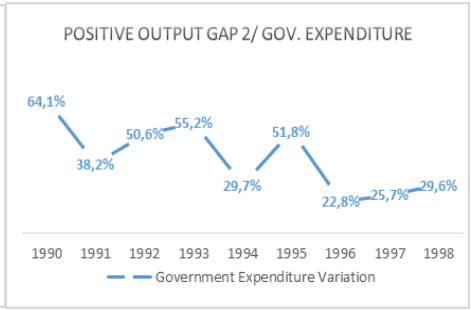


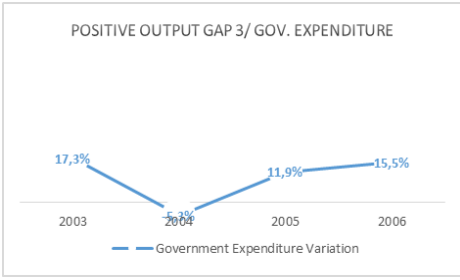


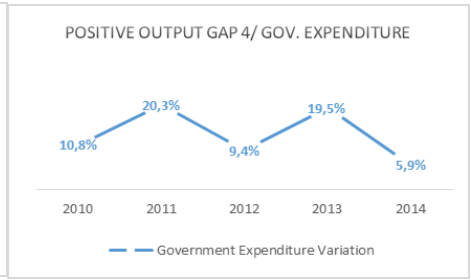


Government Expenditure

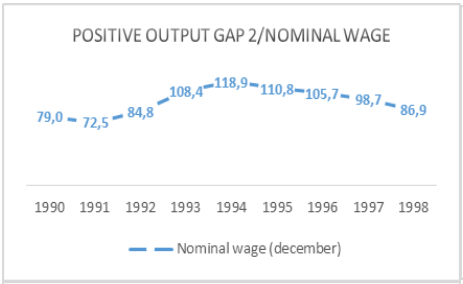


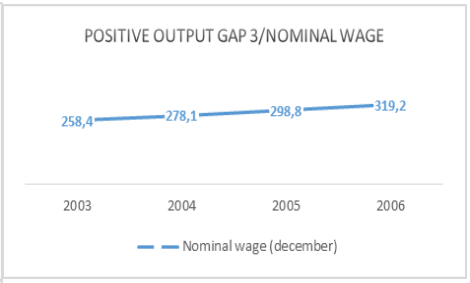




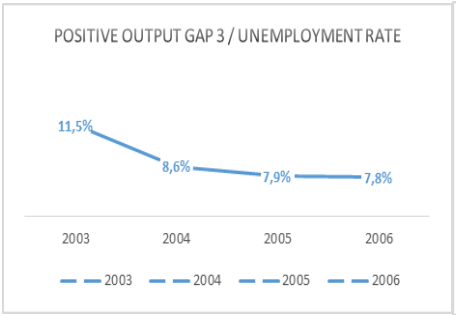


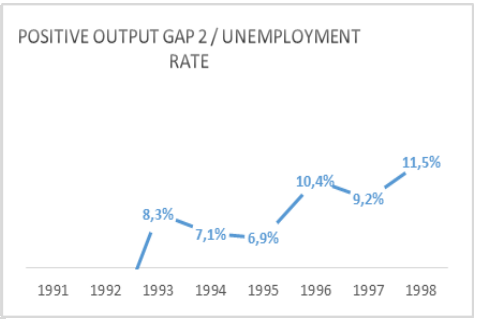
Nominal Wage

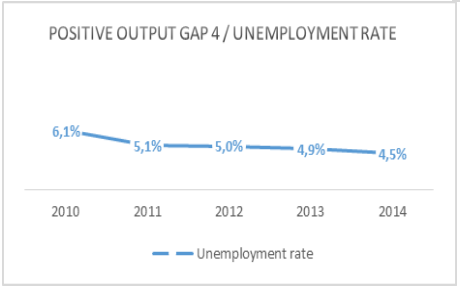




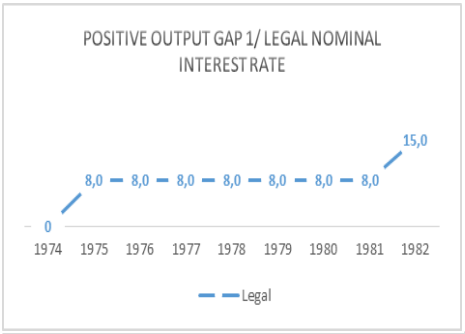
Unemployment Rate

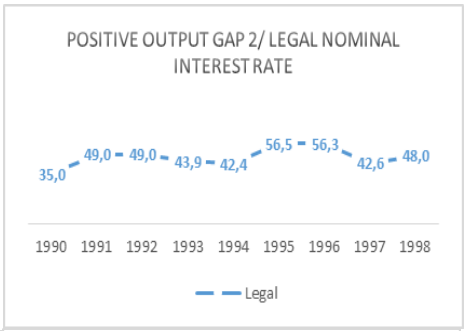


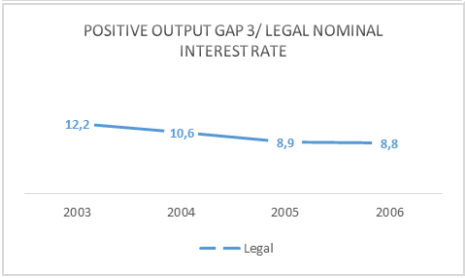


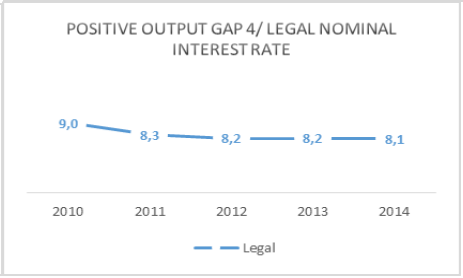


Nominal Interest Rate

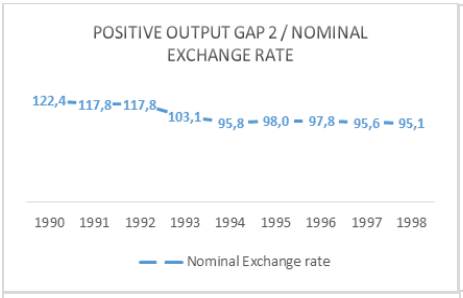


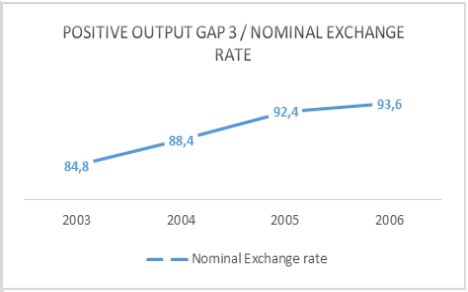


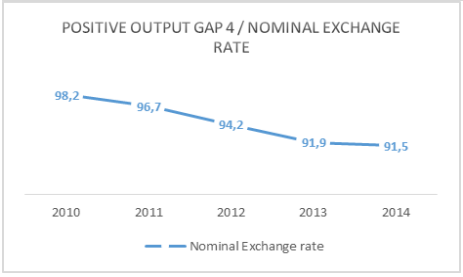




Nominal Exchange Rate



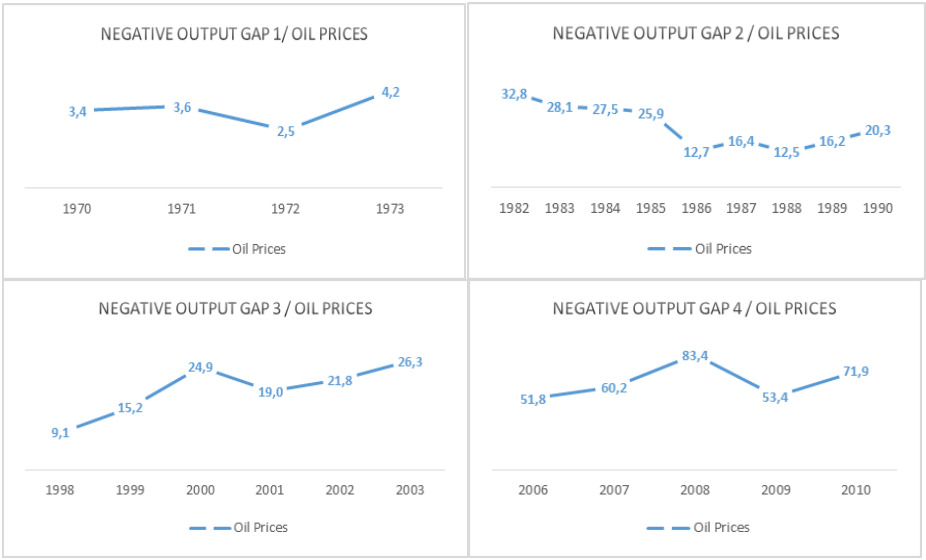




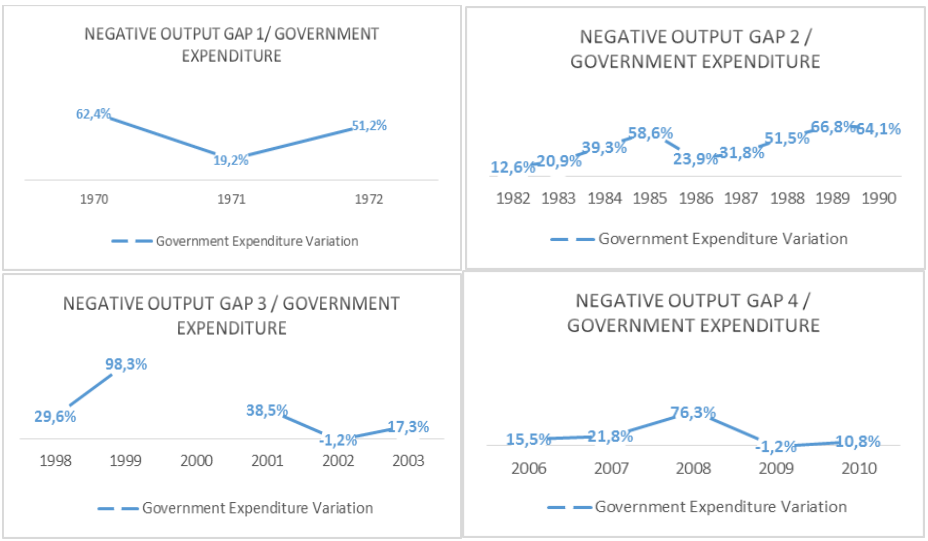
Attachment III

Macroeconomic variables during episodes of negative output gaps.

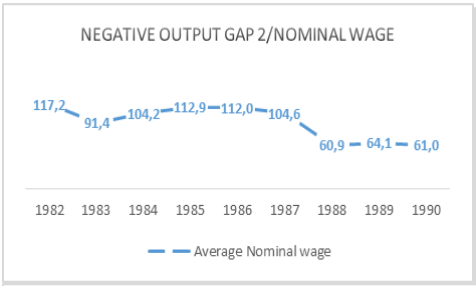
Oil Prices

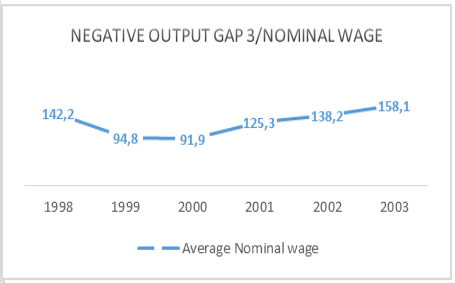


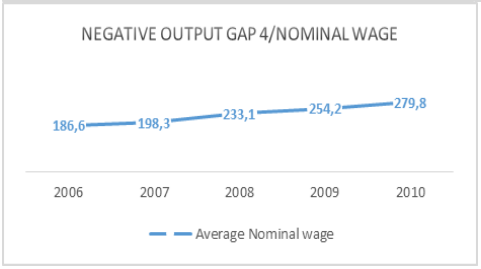
Government Expenditure



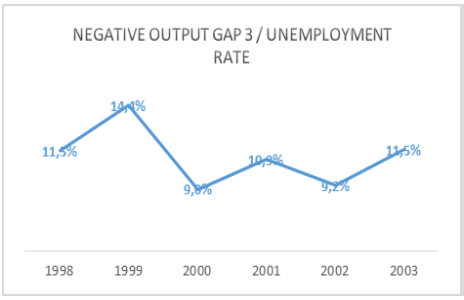
Nominal Wage

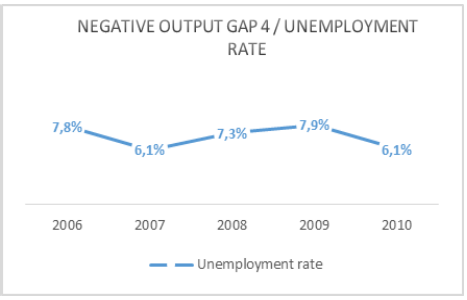




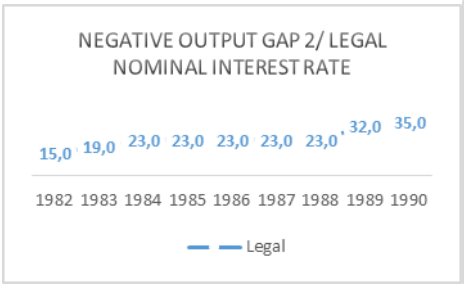


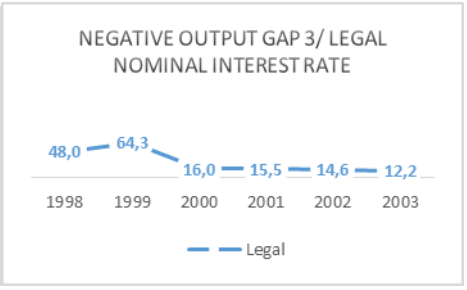
Unemployment Rate

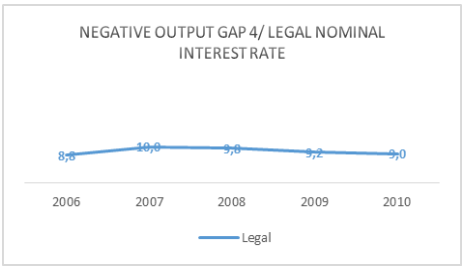




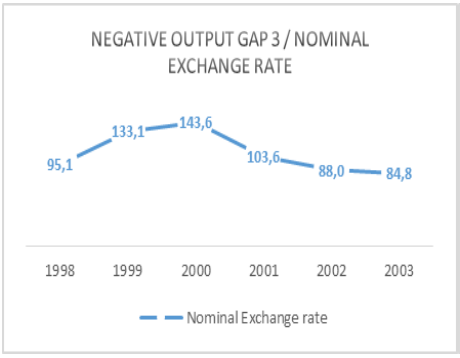
Nominal Interest Rate

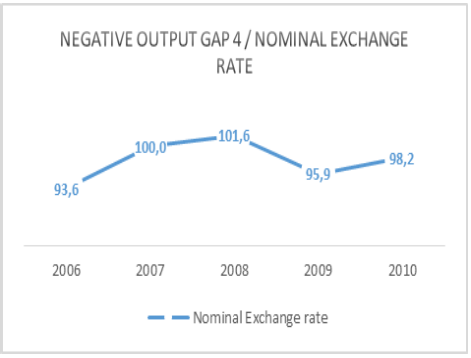






Nominal Exchange Rate





국문초록

에콰도르의 인플레이션과 Output Gap 간 다이나믹스 연구:

1970 년-2014 년 Output Gap 사례에 대한 기술적 분석

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본 연구는 과거 Output Gap 데이터를 바탕으로 인플레이션 다이나믹스에 대한 실증적 및 기술적 분석이다. 이를 통해 본 연구는 각 변수들 간 이론적 예측을 뒷받침하기 위해서 케인지언 필립스 곡선이론을 활용하고 있다. 또한 상기 관계에 대한 기타 요인을 찾기 위해 핵심 거시경제지표들과 역사적 이벤트에 대한 분석도 포함하고 있다.

본 연구는 1970 년부터 2014 년까지 기간 동안 발생했던 각각 네 번의 음의 Output Gap 과 양의 Output Gap 을 연구 대상으로 한다. 분석에 따르면 양의 Output Gap 은 일반적으로 인플레이션을 유발하며 이는 정치적 불안정과 원유 가격 등 사회적 사건에 의해 영향을 받는 것으로 보인다. 한편, 음의 Output Gap 은 디플레이션을 발생시키는 것으로 보이지만 예외는 몇몇 사례에서 보이는 역사적 사건, 낮은 초기 물가상승률, 경제 회복 및 낮은 원유 가격의 영향으로 국한된다.

그림에도 불구하고 이러한 분석결과는 연구 대상 Output Gap 사례 내 인플레이션 및 디플레이션 압력의 관찰을 통해서만 정당성을 확보할 수 있다. 따라서, 본 연구는 몇몇 사례에서 나타난 이론적 예측의 실패는 정부 인플레이션 목표, 원유 가격, 초기 인플레이션률 등의

역사적 사건들에 의한 외부적 충격과 가장 밀접한 관련을 가지고 있다고 분석한다. 전체적으로 과거 사례에 기반한 실제 증거들은 최소한 경제가 앞서 언급한 외부적 충격에 영향을 받지 않았을 경우 Output Gap 이 인플레이션 다이나믹스에 영향을 미친다는 확신을 가능케 한다.

마지막으로 인플레이션을 사전에 감시하고 통제하기 위한 정책과정을 강화하기 위한 일환으로 경제 당국이 Output Gap 을 예측지표로 활용할 것을 제안한다. 따라서, Output Gap 예측은 에콰도르의 현실과 사회구조를 제대로 반영한 현실 적합적인 방법론에 대한 고려가 필수적이다. 추가적으로, 본 연구의 궁극적 목표는 정부에게 과학적 또는 이론적 예측이 사회현상이나 경제 변화를 설명하기에 항상 완벽하거나 적절한 방법이 아니라는 것을 알리고자 함에 있다. 정부의 공공정책은 반드시 과학, 과거 사례, 사회적 맥락과 정치적 판단의 네 측면에 기반하여야 한다.

Key words: Output gap 과 인플레이션, 인플레이션과 역사적 사건, 에콰도르의 output gap, 에콰도르의 인플레이션.

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